FACULTY OF SCIENCE

Faculty of Sciences has been founded as a result of a reorganization in 1993. A four year bachelor academic program is provided in Biology, Physics, Statistics, Chemistry and Mathematics branches. This academic program is supported by a one year English Prep. School, Advenced English courses and optional branch courses in English which enable the students to get a better use of the foreign resources. Along with the branch courses, courses with social and cultural content are also given in order to provide a larger point of view in addition to expertise areas. Our aim is to provide expertise to our students in labaratories and classrooms with high technology and make sure that they are educated as contemporary, creative, rational, self confident, analytical individuals.

Dean	: Prof.Dr. Yeliz MERT KANTAR
Vice-Dean	: Assoc. Prof.Dr. Özer GÖK
Vice-Dean	: Assoc. Prof.Dr. Nesil ERTORUN
Secretary to the Faculty	: Ayfer OLCAY

STAFF

Professors:
Meryem AKBELEN, Emrah AKYAR, Handan AKYAR, Ferhat ALTUNSOY, Hülya ALTUNTAŞ, Özgür ALVER, Muhittin ARSLANYOLU, Ahmet Şenol AYBEK, Hüseyin AZCAN, Şenay BULUT, Taner BÜYÜKKÖROĞLU, Vakıf CAFER, 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, Yüksel ERGÜN, Arzu ERSÖZ, Kıymet GÜVEN, Tülay HURMA, Deniz HÜR, Haluk HÜSEYİN, Saliha ILICAN, Betül KAN KILINÇ, İbrahim KANİ, Abidin KILIÇ, Metin KUL, Nihal KUŞ, H.mehtap KUTLU, Murat LİMONCU, Yeliz MERT KANTAR, M.burçin MUTLU, Ali ÖZCAN, Adnan ÖZCAN, Asiye Safa ÖZCAN, Ayça ÖZCAN, Nülifer ÖZDEMİR, Yunus ÖZDEMİR, Elif ÖZTETİK, Uğur SERİNCAN, Emel SÖZEN, Sevil ŞENTÜRK, 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, Filiz ALANYALI, Zerrin AŞAN, İlker AVAN, Harun BÖCÜK, Nuray CANDEMİR, Nezahat ÇETİN, Yasemin DEMİRCİOĞLU, Bilge ERDEM, Utku ERDOĞAN, Emel ERGENE, Emel ERMİŞ, Nesil ERTORUN, Özer GÖK, Ertuğrul İZCİ, Nevin KANIŞKAN, Nazmiye KERVAN, Gözde KILIÇ, Volkan KILIÇ, Mustafa KULAKCI, Yasemin MUTLU, Elif Mine ÖNCÜ KAYA, Özer ÖZDEMİR, Recep Sulhi ÖZKÜTÜK, Züleyha ÖZTAŞ, Kadir Özgür PEKER, Mustafa SALTAN, Neslihan ŞAHİN, Figen TAKIL MUTLU, Hakan ÜNVER, Adem Ersin ÜREYEN

Faculty Members:
Şirin AKTAY, Metin ALTAN, Burcu ARPAPAY, Atilla ASLANARGUN, Türkay AYTEKİN AYDIN, Özge BAĞLAYAN, Alper BEKKİ, Hüseyin BERBER, Halil BERBER, Özlem BİÇEN ÜNLÜER, Mustafa ÇAVUŞ, Derya ÇELİK, Zafer DİKMEN, Dilek ELMALI, Oğuz ERTUĞRUL, Halil GAMSIZKAN, Sultan Funda GÖRKEM, İlknur GÜVENÇ, Gülçin IŞIK, Çiğdem KALATHILPARMBİL, Hamit MERMERKAYA, Levent TERLEMEZ, Didem TOZKAN

Lecturers:
Caner AYDINLI, Erdoğan ÇAKIR, Züliyet ÇELİKBİLEK, Belma DEĞİRMENCİ, Figen ERDOĞAN, Halil ERYILMAZ, Tülay TIRAŞ, Tülay TOLAN

Research Assistants:
Emre AKDOĞAN, Burak ARATAN, Nisa ASLAN, Burak BERBER, Samet BİLA, Gökçe ÇAKMAK, Arsen DEMİROĞLU, Mehmet ERGEN, Orkun ERGÜRHAN, Hanefi Gezer, Hatice GÜNEY, Cenk İÇÖZ, Erhan İLTER, Nihal İNCE, Pınar KAPÇI, H.açelya KAPKAÇ, Bahar KARAMAN, Merve KESKİNOĞLU, Fatma Diğdem KOPARAL, Halenur ÖZER, Seçil ŞENTORUN, Edanur TAŞTAN, Ayşe TORUN, Seyfettin TÜRK, Mustafa UZUN, Elif ÜNAL, Dilek YALÇIN, İsmail YENİLMEZ, Kübranur YILMAZ

DEPARTMENT OF BIOLOGY

Biology as a multidisciplinary science is strongly interrelated with the basic sciences of physics, chemistry and mathematic. The principles of these basic sciences together with the fundamentals of biology that apply to understanding of living organisms and systems reflects on the courses offered in the Biology undergraduate program. The undergraduate curriculum focuses the

general biology teaching with courses related biology, zoology, ecology, plant biology, evolution and molecular biology. The main goal of this curriculum raise biologists to be able to elucidate fundamentals of biology for humankind's better living without causing environmental damages. Biology is in an explosive developmental phase by which it will certainly create many fascinating jobs for the coming generation. Biology has a number of subfields where you could specialise to become an expert.

Department Head : Prof.Dr. Berrin TÜYLÜ
Deputy Department Head : Dr. Lecturer Gülçin IŞIK
Deputy Department Head : Assoc. Prof.Dr. Volkan KILIÇ

PROGRAM

I.Semester

BİY103	Biomathematics	3+0	3.0
BİY117	General Biology I	4+0	6.0
BİY119	General Biology Laboratory I	0+4	3.0
BİY137 (Eng)	Introduction to Molecular Biology	2+0	2.0
BİY137	Introduction to Molecular Biology	2+0	2.0
BİY139	Microscopy and Preparation Techniques	1+2	3.0
JEO101	General Geology	2+0	2.0
KİM129	General Chemistry	4+0	4.0
KİM129 (Eng)	General Chemistry	4+0	4.0
KİM131	General Chemistry Laboratory	0+2	2.0
KİM131 (Eng)	General Chemistry Laboratory	0+2	2.0
TÜR125	Turkish Language I	2+0	2.0
	Yabancı Dil Dersleri I	--	3.0

			30.0

II.Semester

BİY104	Biophysics	3+0	4.0
BİY106 (Eng)	Applied Biology	2+0	3.0
BİY106	Applied Biology	2+0	3.0
BİY118	General Biology II	4+0	6.0
BİY120	General Biology Laboratory II	0+4	3.0
İST209	Biostatistics	3+0	2.5
KİM208 (Eng)	Organic Chemistry	3+0	4.0
KİM208	Organic Chemistry	3+0	4.0
TÜR126	Turkish Language II	2+0	2.0
	Seçmeli Ders	--	2.5
	Yabancı Dil Dersleri II	--	3.0

			30.0

III.Semester

BİY213	Cryptogams	2+0	2.5
BİY215 (Eng)	Microbiology I	2+0	2.5
BİY215	Microbiology I	2+0	2.5
BİY217 (Eng)	Microbiology Laboratory I	0+2	2.0
BİY217	Microbiology Laboratory I	0+2	2.0
BİY219	Cryptogams Laboratory	0+2	2.0
BİY221	Plant Morphology	2+0	2.5
BİY223	Plant Morphology Laboratory	0+2	2.0
BİY225	Cytology	2+0	2.0
BİY227	Cytology Laboratory	0+2	2.0
BİY229	Invertabrate Animals	2+0	2.5
BİY231	Invertabrate Animals Laboratory	0+2	2.0
BİY239 (Eng)	Molecular Biology	2+0	2.0
BİY239	Molecular Biology	2+0	2.0

IV.Semester

BİY216 (Eng)	Microbiology II	2+0	2.5
BİY216	Microbiology II	2+0	2.5
BİY218 (Eng)	Microbiology Laboratory II	0+2	2.0
BİY218	Microbiology Laboratory II	0+2	2.0
BİY220	Seed Plants	2+0	2.5
BİY222	Seed Plants Laboratory	0+2	2.0
BİY224	Vertabrate Animals	2+0	2.5
BİY226	Vertabrate Animals Laboratory	0+2	2.0
BİY228	Arthropoda	2+0	2.5
BİY230	Arthropods Laboratory	0+2	2.0
BİY232	General Ecology	2+0	3.0
BİY234	General Ecology Laboratory	0+2	2.0
TAR166	Atatürk's Principles and History of Turkish Revolution II	2+0	2.0
	Seçmeli Ders	--	5.0

BİY241 (Eng)	Molecular Biology Laboratory	0+2	2.0
BİY241	Molecular Biology Laboratory	0+2	2.0
TAR165	Atatürk's Principles and History of Turkish Revolution I	2+0	2.0
	Seçmeli Ders	--	2.0

			30.0

V.Semester

BİY305	Molecular Cell Physiology	2+0	2.5
BİY339	Physiology of Animals	2+0	2.5
BİY341	Physiology Laboratory of Animals	0+2	2.0
BİY371	Biotechnology	2+0	2.5
BİY373	Biotechnology Laboratory	0+2	2.0
BİY395 (Eng)	Biochemistry I	2+0	2.5
BİY395	Biochemistry I	2+0	2.5
BİY397 (Eng)	Biochemistry Laboratory I	0+2	2.0
BİY397	Biochemistry Laboratory I	0+2	2.0
	Mesleki Seçmeli Dersler	--	14.0

			30.0

VI.Semester

BİY354	Plant Physiology	2+0	2.5
BİY354 (Eng)	Plant Physiology	2+0	2.5
BİY356	Plant Physiology Laboratory	0+2	2.0
BİY356 (Eng)	Plant Physiology Laboratory	0+2	2.0
BİY358	Genetics	2+0	2.5
BİY360	Genetic Laboratory	0+2	2.0
BİY396 (Eng)	Biochemistry II	2+0	2.5
BİY396	Biochemistry II	2+0	2.5
BİY398 (Eng)	Biochemistry Laboratory II	0+2	2.0
BİY398	Biochemistry Laboratory II	0+2	2.0
	Seçmeli Ders	--	3.0
	Mesleki Seçmeli Dersler	--	13.5

			30.0

VII.Semester

BİY405	Developmental Biology I	2+0	3.0
BİY412	Plant Geography	2+0	3.0
BİY414	Zoogeography	2+0	3.0
BİY457 (Eng)	Molecular Genetics	2+0	3.0
BİY457	Molecular Genetics	2+0	3.0
BİY488 (Eng)	Biology Project I	0+4	7.0
BİY488	Biology Project I	0+4	7.0
	Seçmeli Ders	--	3.0
	Mesleki Seçmeli Dersler	--	8.0

			30.0

VIII.Semester

BİY402	The Evolution	2+0	3.0
BİY404	Human Biology	2+0	3.0
BİY406	Developmental Biology II	2+0	3.0
BİY420 (Eng)	Biology Project II	0+4	7.0
BİY420	Biology Project II	0+4	7.0
	Seçmeli Ders	--	2.0
	Mesleki Seçmeli Dersler	--	12.0

			30.0

Foreign Language Courses

ALM175 (Ger)	German I	3+0	3.0
ALM176 (Ger)	German II	3+0	3.0
FRA175 (Fra)	French I	3+0	3.0
FRA176 (Fra)	French II	3+0	3.0
İNG187 (Eng)	English I	3+0	3.0
İNG188 (Eng)	English II	3+0	3.0

Elective Courses

BEÖ155	Physical Education	2+0	2.0
ESTÜ101	Introduction to University Life	0+1	2.0
ESTÜ111	Volunteering Works	1+2	4.0
ESTÜ112	Cyber Security for Everyone	2+0	2.0
ESTÜ113	Design Thinking	3+0	3.0
ESTÜ114	Visual Thinking	3+0	3.0
ESTÜ115	Photographic Viewpoint	2+1	3.0
ESTÜ116	Computer Aided Design I	3+0	3.0
ESTÜ117	Computer Aided Design II	3+0	3.0
ESTÜ118	Visual Thinking with Concepts	3+0	3.0
ESTÜ119	Flute	3+1	3.0
ESTÜ120	Solfege	3+1	3.0
ESTÜ121	Piano	3+1	3.0
ESTÜ122	Guitar	3+1	3.0
İNG325 (Eng)	Academic English III	3+0	3.0
İNG326 (Eng)	Academic English IV	3+0	3.0
MÜZ155	Turkish Folk Music	2+0	2.0
MÜZ157	Traditional Turkish Art Music	2+0	2.0
SAN155	Hall Dances	0+2	2.0
SNT155	History of Art	2+0	2.0
SOS155	Folkdance	2+0	2.0
THU203	Community Services	0+2	3.0
TÜR120	Turkish Sign Language	3+0	3.0

Area Elective Courses

BİY313	Ethology	2+0	4.0
BİY316	Endocrinology	2+0	4.0
BİY317	Mycology	2+0	4.0
BİY318	Insect Ecology	2+0	4.0
BİY319	Enzymology	2+0	4.0
BİY326	Biodiversity and Flora of Turkey	2+0	4.0
BİY328	Paleontology	2+0	4.0
BİY329	Environmental Impact Assessment	2+0	4.0
BİY330	Techniques in Systematic Botany	2+0	4.0
BİY334	Biological Control	2+0	4.0
BİY336	Ornithology	2+0	4.0
BİY343	Hydrobiology	2+0	4.0
BİY352	Introduction to Lichenology	2+0	4.0
BİY367	Microorganisms and Energy	2+0	4.0
BİY369	Medical Plants	2+0	4.0
BİY374	Immunology	2+0	4.0
BİY375	Forensic Biology	2+0	4.0
BİY376	Virology	2+0	4.0
BİY377	Foodborne Pathogenic Microorganisms	0+3	5.0
BİY378	Statistical Applications in Biology	2+0	4.0
BİY379	Histology	0+3	5.0
BİY383	Microbial Techniques	0+3	5.0
BİY384	Plant Ecology	2+0	4.0
BİY385	Comparative Anatomy and Morphology of Animals	2+0	4.0
BİY386	Microbial Ecology	2+0	4.0
BİY388	Molecular Biology Techniques	2+0	4.0
BİY390	Wastewater Microbiology	2+0	4.0
BİY391	Cell Signaling Mechanisms	2+0	4.0
BİY392	Human Gene Therapeutics and Recombinant Production	2+0	4.0
BİY394	Entrepreneurship in Biology:Design and Development	2+0	4.0
BİY401	Plant Mineral Nutrition	2+0	4.0
BİY408	Embryology	2+0	4.0
BİY409	Human Genetics	2+0	4.0
BİY410	Medical Microbiology	2+0	4.0
BİY413	Soil-Plant Relation	2+0	4.0
BİY415	Fish Biology	2+0	4.0
BİY416	Aquaculture	2+0	4.0
BİY421 (Eng)	Molecular Biology of Development	2+0	4.0

BİY424	Biology of Cancer	2+0	4.0
BİY426	General Parasitology	2+0	4.0
BİY427	Cosmetics Microbiology	2+0	4.0
BİY430	Genetic Toxicology	2+0	4.0
BİY431	Introductory Bioinformatics	2+0	4.0
BİY433	Plant Genetic Engineering	2+0	4.0
BİY433 (Eng)	Plant Genetic Engineering	2+0	4.0
BİY434	Plant Biotechnology	2+0	4.0
BİY435	Hydrobotany	2+0	4.0
BİY436	Ethnobotanic	2+0	4.0
BİY439	Microbial Biotechnology	2+0	4.0
BİY440	Animal Toxins	2+0	4.0
BİY445	Biological Anthropology	2+0	4.0
BİY451	Diagnostic Microbiology	2+0	4.0
BİY455	Microbial Physiology	2+0	4.0
BİY462	Actinomycetes and Antibiotics of Actinomycetes	2+0	4.0
BİY465	Clinical Biochemistry	2+0	4.0
BİY467 (Eng)	Conservation Biology	2+0	4.0
BİY468	Oxidative Stress and Antioxidants	2+0	4.0
BİY468 (Eng)	Oxidative Stress and Antioxidants	2+0	4.0
BİY469	Forensic Entomology	2+0	4.0
BİY470	Environmental Biology	2+0	4.0
BİY471 (Eng)	Molecular Microbial Ecology	0+3	5.0
BİY471	Molecular Microbial Ecology	0+3	5.0
BİY472	Nutritional Biochemistry	2+0	4.0
BİY472 (Eng)	Nutritional Biochemistry	2+0	4.0
BİY473	Biophotography	2+0	4.0
BİY474	Medical Parasitology	0+3	5.0
BİY475	Mycotoxins	2+0	4.0
BİY476	Food Microbiology	2+0	4.0
BİY477	Microfungus Identification Methods	0+3	5.0
BİY478	Plant Identification and Herbarium Techniques	0+3	5.0
BİY480	Industrial Microbiology	2+0	4.0
BİY482	Introductory Molecular Biotechnology	2+0	4.0
BİY484	Molecular Microbiology Techniques	0+3	5.0
İNG361 (Eng)	English for Specific Purposes I	2+0	4.0
İNG362 (Eng)	English for Specific Purposes II	2+0	4.0

CHEMICAL BIOLOGICAL RADIOLOGICAL AND NUCLEAR (CBRN) DEFENSE MINOR PROGRAM

DEPARTMENT OF BIOLOGY (ENG) (ABD STATE UNIVERSTY OF NEW YORK UNIVERSTY AT ALBANY)

Department Head :
Deputy Department Head : Assoc. Prof.Dr. Volkan KILIÇ

DEPARTMENT OF PHYSICS

The Department of Physics with an increasing trend. Our department focuses on providing students with a quality education in the field of physics by using the modern technologies. The duration of the programme is 4 years. Students who fail to pass the English Proficiency Exam must attend a one-year English Preparatory School before taking the department courses. Students are required to have Physics Project I-II course at last year and must pass all the courses and obtain a minimum GPA (Grade Point Average) of 2.00 out of 4.00 for their graduation. The official language of instruction is both Turkish and English. Our graduates can pursue academic careers in universities; work in R&D departments of industry or various institutions, or become

a teacher if they completed Teacher Education Program. The Physics Department offers both the Master of Science and Doctor of Philosophy degrees in Physics. Our students select one of the following research areas: General physics, Atomic and Molecular Physics, Solid State Physics and High Energy Physics. Research laboratories are well equipped and capable of undertaking national research projects such as DPT and TUBİTAK projects.

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

PROGRAM

I.Semester

FİZ115	Physics I	4+2	9.0
FİZ115 (Eng)	Physics I	4+2	9.0
FİZ117	Physics Laboratory I	1+2	4.0
FİZ117 (Eng)	Physics Laboratory I	1+2	4.0
KİM103	General Chemistry I	4+2	6.0
KİM103 (Eng)	General Chemistry I	4+2	6.0
MAT199 (Eng)	Calculus I	5+1	5.5
MAT199	Calculus I	5+1	5.5
	Seçmeli Ders	--	2.5
	Yabancı Dil Dersleri I	--	3.0
			30.0

II.Semester

FİZ116	Physics II	4+2	9.0
FİZ116 (Eng)	Physics II	4+2	9.0
FİZ118	Physics Laboratory II	1+2	4.0
FİZ118 (Eng)	Physics Laboratory II	1+2	4.0
KİM104	General Chemistry II	4+2	6.0
KİM104 (Eng)	General Chemistry II	4+2	6.0
MAT196 (Eng)	Calculus II	5+1	5.5
MAT196	Calculus II	5+1	5.5
	Seçmeli Ders	--	2.5
	Yabancı Dil Dersleri II	--	3.0
			30.0

III.Semester

FİZ229	Mathematical Methods in Physics I	4+0	6.0
FİZ229 (Eng)	Mathematical Methods in Physics I	4+0	6.0
FİZ231	Waves and Optics	4+0	5.0
FİZ233	Waves and Optics Laboratory	0+2	3.0
FİZ233 (Eng)	Waves and Optics Laboratory	0+2	3.0
MAT261	Differential Equations	3+0	5.0
MAT261 (Eng)	Differential Equations	3+0	5.0
TAR165	Atatürk's Principles and History of Turkish Revolution I	2+0	2.0
TÜR125	Turkish Language I	2+0	2.0
	Seçmeli Ders	--	7.0
			30.0

IV.Semester

FİZ218	Modern Physics	4+0	6.0
FİZ218 (Eng)	Modern Physics	4+0	6.0
FİZ230	Mathematical Methods in Physics II	4+0	6.0
FİZ230 (Eng)	Mathematical Methods in Physics II	4+0	6.0
TAR166	Atatürk's Principles and History of Turkish Revolution II	2+0	2.0
TER206	Thermodynamics	4+0	5.0
TÜR126	Turkish Language II	2+0	2.0
	Seçmeli Dersler	--	9.0
			30.0

V.Semester

FİZ307	Electromagnetic Theory I	4+0	6.0
FİZ315	Quantum Physics Laboratory I	0+2	3.0
FİZ315 (Eng)	Quantum Physics Laboratory I	0+2	3.0
FİZ327	Quantum Physics I	4+0	6.0
FİZ327 (Eng)	Quantum Physics I	4+0	6.0
MEK301	Theoretical Mechanics I	4+0	6.0
	Seçmeli Dersler	--	9.0

VI.Semester

FİZ308	Electromagnetic Theory II	4+0	6.0
FİZ316	Quantum Physics Laboratory II	0+2	3.0
FİZ316 (Eng)	Quantum Physics Laboratory II	0+2	3.0
FİZ328	Quantum Physics II	4+0	6.0
FİZ328 (Eng)	Quantum Physics II	4+0	6.0
MEK302	Theoretical Mechanics II	4+0	6.0
	Seçmeli Dersler	--	9.0

			30.0				30.0
	VII.Semester				**VIII.Semester**		
FİZ429	Solid State Physics	4+0	6.0	FİZ212	Statistical Physics	4+0	5.0
FİZ429 (Eng)	Solid State Physics	4+0	6.0	FİZ428 (Eng)	Nuclear Physics	4+0	6.0
FİZ431	Physics Project I	2+4	7.0	FİZ428	Nuclear Physics	4+0	6.0
FİZ431 (Eng)	Physics Project I	2+4	7.0	FİZ432	Physics Project II	2+4	7.0
FİZ433	Atom and Molecular Physics	4+0	6.0	FİZ432 (Eng)	Physics Project II	2+4	7.0
	Seçmeli Dersler	--	11.0		*Seçmeli Dersler*	--	12.0
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			30.0				30.0

Foreign Language Courses

ALM175 (Ger)	German I	3+0	3.0
ALM176 (Ger)	German II	3+0	3.0
FRA175 (Fra)	French I	3+0	3.0
FRA176 (Fra)	French II	3+0	3.0
İNG187 (Eng)	English I	3+0	3.0
İNG188 (Eng)	English II	3+0	3.0

Elective Courses

ARY411	Research Methods in Physics	2+0	3.0
BEÖ155	Physical Education	2+0	2.0
BİL110	Computer Programming	2+0	3.0
BİL213	Computer Using	2+0	3.0
BİL308	Advanced Programming	2+0	3.0
BRİ101	Bridge	2+0	3.0
ELE303	Electric Circuit Analysis	2+0	3.0
ELE304 (Eng)	Electric Circuit Analysis Laboratory	0+2	3.0
ELE304	Electric Circuit Analysis Laboratory	0+2	3.0
ELO302	Application of Electronic Circuit Elements	2+0	3.0
ELO309	Electronic	2+0	3.0
ELO310 (Eng)	Electronic Laboratory	0+2	3.0
ELO310	Electronic Laboratory	0+2	3.0
ELO402	Digital Electronics	2+0	3.0
ESTÜ101	Introduction to University Life	0+1	2.0
ESTÜ111	Volunteering Works	1+2	4.0
ESTÜ112	Cyber Security for Everyone	2+0	2.0
ESTÜ113	Design Thinking	3+0	3.0
ESTÜ114	Visual Thinking	3+0	3.0
ESTÜ115	Photographic Viewpoint	2+1	3.0
ESTÜ116	Computer Aided Design I	3+0	3.0
ESTÜ117	Computer Aided Design II	3+0	3.0
ESTÜ118	Visual Thinking with Concepts	3+0	3.0
ESTÜ119	Flute	3+1	3.0
ESTÜ120	Solfege	3+1	3.0
ESTÜ121	Piano	3+1	3.0
ESTÜ122	Guitar	3+1	3.0
FEL401	Philosophy of Science	2+0	2.5
FİZ113 (Eng)	Technical English	4+0	4.0
FİZ122 (Eng)	English for Physicists	4+0	4.0
FİZ124	Introduction to Metrology	2+0	3.0
FİZ235	Basic Information at Experimental Research	2+0	3.0
FİZ259 (Eng)	Seminar in Physics	2+0	3.0
FİZ304	Clean Energy Sources	2+0	3.0
FİZ312	Applications of Computer in Physics Laboratories	2+0	3.0
FİZ318	Introduction to Heat Transfer	2+0	3.0
FİZ321 (Eng)	Semiconductors	2+0	3.0
FİZ321	Semiconductors	2+0	3.0
FİZ322 (Eng)	Semiconductors Devices	2+0	3.0
FİZ322	Semiconductors Devices	2+0	3.0

FİZ324	Superconductors	2+0	3.0
FİZ325	Applications of Computer in Physics	2+0	3.0
FİZ329	Semiconductors Laboratory	2+0	3.0
FİZ330	Semiconductor Applied Laboratory	2+0	3.0
FİZ331	Nobel Prizes on Physics	2+0	3.0
FİZ332	Introduction to Low Temperature Physics	2+0	3.0
FİZ333	Quality Control Methods in Physics	2+0	3.0
FİZ334	History of Science	2+0	3.0
FİZ335	Physical Events and Comments	2+0	3.0
FİZ336	Solar Photouoltaics	2+0	3.0
FİZ337	Solar Energy and Applications	2+0	3.0
FİZ338 (Eng)	Labview and Data Acquisition	2+0	3.0
FİZ339	Radioecology and Ecosystem	2+0	3.0
FİZ340	Some Applications of Physics in Medical Science	2+0	3.0
FİZ341	Metrology I	2+0	3.0
FİZ342	Metrology II	2+0	3.0
FİZ403	Spectroscopic Methods	2+0	3.0
FİZ404	Physics Education	2+0	3.0
FİZ413	Physical Foundation of Astronomy	2+0	3.0
FİZ414	Fundamantals of Astrophysics	2+0	3.0
FİZ416	Environmental Physics	2+0	3.0
FİZ421	Introduction to Plasma Physics	2+0	3.0
FİZ422	Plasma and Fusion Energy	2+0	3.0
FİZ425	High Energy Physics	2+0	3.0
FİZ430	Laser Physics	2+0	3.0
FİZ434	Atomic Spectroscopy	2+0	3.0
FİZ436 (Eng)	Basics of Semiconductors	2+0	3.0
FİZ437 (Eng)	Theory of Relativity I	2+0	3.0
FİZ438 (Eng)	Theory of Relativity II	2+0	3.0
FİZ439	Observational Data Analysis in Astrophysic	2+0	3.0
FİZ440	Structural Analysis of Solids	2+0	3.0
FİZ441	Non-Associative Algebras and Physics	2+0	3.0
FİZ442	Molecular Spectroscopy	2+0	3.0
FİZ443	Characterization Methods	2+0	3.0
FİZ444	Satellite Data Analysis Techniques	2+0	3.0
FİZ446	Applied Heat Theory	0+2	3.0
FİZ448	X-Ray Diffraction Analysis Techniques	2+0	3.0
FİZ449	Structural and Vibrational Theory of Molecules	2+0	3.0
FİZ452	Particle Physics	3+0	3.0
FİZ454 (Eng)	Nuclear Physics Laboratory	0+2	3.0
İNG325 (Eng)	Academic English III	3+0	3.0
İNG326 (Eng)	Academic English IV	3+0	3.0
MEK308	Fluid Mechanics	2+0	3.0
MÜZ155	Turkish Folk Music	2+0	2.0
MÜZ157	Traditional Turkish Art Music	2+0	2.0
SAN155	Hall Dances	0+2	2.0
SEK230	Speed Reading Techniques and Shorthand	1+1	3.0
SNT155	History of Art	2+0	2.0
SOS155	Folkdance	2+0	2.0
TAR201	History of Science	2+0	2.5
THU203	Community Services	0+2	3.0
TİY152	Theatre	2+0	2.5
TÜR120	Turkish Sign Language	3+0	3.0

NANOSCIENCE MINOR PROGRAM

DEPARTMENT OF STATISTICS (30% ENGLISH)

Department of Statistics; consists of degree programs of Theoritical Statistics and Applied Statistics. Besides the theoritical courses, there are computer laboratories which have required database in order to be expert on this science area. The aim of the

department is the assignment of the data source and the statistical techniques related with the comprehensive experiments and observations, and the training of the qualitative researchers who center the data and generate required information by making interpretations of the behaviour of the system based on the results of the solutions. Students graduate from Department of Statistics are employed at academical staff, sector of bank and insurance, research company, quality control of public and custom sectors, units of stock assessment, journalism and television foundations and hospitals and etc.

Department Head : Prof.Dr. İlhan USTA
Deputy Department Head : Assoc. Prof.Dr. Özer ÖZDEMİR
Deputy Department Head : Assoc. Prof.Dr. Şükrü ACITAŞ

PROGRAM

I.Semester				II.Semester			
İST109	Document Preparation in Computer	3+0	3.5	BİL168	Computer Programming	4+0	5.0
İST109 (Eng)	Document Preparation in Computer	3+0	3.5	İST118 (Eng)	Fundamental Statistics II	4+0	6.0
İST117 (Eng)	Fundamental Statistics I	4+0	6.0	İST118	Fundamental Statistics II	4+0	6.0
İST117	Fundamental Statistics I	4+0	6.0	İST126	Probability II	4+0	6.0
İST239	Probability I	4+0	6.0	İST126 (Eng)	Probability II	4+0	6.0
İST239 (Eng)	Probability I	4+0	6.0	MAT196 (Eng)	Calculus II	5+1	5.5
MAT199 (Eng)	Calculus I	5+1	5.5	MAT196	Calculus II	5+1	5.5
MAT199	Calculus I	5+1	5.5	TAR166	Atatürk's Principles and History of Turkish Revolution II	2+0	2.0
TAR165	Atatürk's Principles and History of Turkish Revolution I	2+0	2.0		*Seçmeli Dersler*	--	5.5
	Seçmeli Dersler	--	7.0				
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			30.0				30.0

III.Semester				IV.Semester			
İST235	Linear Algebra I	4+0	5.0	BİL802	Visual Programming	4+0	4.0
İST247	Mathematical Statistics I	4+0	7.0	İST236	Linear Algebra II	4+0	5.0
İST247 (Eng)	Mathematical Statistics I	4+0	7.0	İST248	Mathematical Statistics II	4+0	7.0
MAT209	Analysis I	4+0	7.0	İST248 (Eng)	Mathematical Statistics II	4+0	7.0
TÜR125	Turkish Language I	2+0	2.0	MAT212	Analysis II	4+0	7.0
	Seçmeli Ders	--	4.0	TÜR126	Turkish Language II	2+0	2.0
	Mesleki Seçmeli Dersler	--	5.0		*Seçmeli Ders*	--	2.0
					Mesleki Seçmeli Dersler	--	3.0
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			30.0				30.0

V.Semester				VI.Semester			
İST305	Operational Research	3+0	6.0	İKT382 (Eng)	Econometrics I	4+0	6.0
İST309	Experimental Design I	3+0	6.0	İKT382	Econometrics I	4+0	6.0
İST309 (Eng)	Experimental Design I	3+0	6.0	İST311 (Eng)	Non-Parametric Statistical Methods	3+0	5.5
İST333 (Eng)	Regression Analysis	4+0	6.5	İST311	Non-Parametric Statistical Methods	3+0	5.5
İST333	Regression Analysis	4+0	6.5	İST335	Sampling	4+0	6.5
İST351	Statistical Packages I	2+0	3.0	İST352	Statistical Packages II	2+0	3.0
	Seçmeli Ders	--	3.5		*Seçmeli Ders*	--	3.0
	Mesleki Seçmeli Dersler	--	5.0		*Mesleki Seçmeli Dersler*	--	6.0
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			30.0				30.0

VII.Semester				VIII.Semester			
İST407	Statistics Project I	0+4	6.0	İST408	Statistics Project II	0+4	6.0
İST407 (Eng)	Statistics Project I	0+4	6.0	İST408 (Eng)	Statistics Project II	0+4	6.0
İST411	Time Series Analysis	4+0	5.0	İST430	Stochastic Processes	4+0	5.0
İST451	Multivariate Statistics I	4+0	6.0		*Seçmeli Ders*	--	4.0
İST451 (Eng)	Multivariate Statistics I	4+0	6.0		*Mesleki Seçmeli Dersler*	--	15.0
	Seçmeli Ders	--	6.0				
	Mesleki Seçmeli Dersler	--	7.0				
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			30.0				30.0

Elective Courses

ALM175 (Ger)	German I	3+0	3.0
ALM176 (Ger)	German II	3+0	3.0
BEÖ155	Physical Education	2+0	2.0
ESTÜ101	Introduction to University Life	0+1	2.0
ESTÜ111	Volunteering Works	1+2	4.0
ESTÜ112	Cyber Security for Everyone	2+0	2.0
ESTÜ113	Design Thinking	3+0	3.0
ESTÜ114	Visual Thinking	3+0	3.0
ESTÜ115	Photographic Viewpoint	2+1	3.0
ESTÜ116	Computer Aided Design I	3+0	3.0
ESTÜ117	Computer Aided Design II	3+0	3.0
ESTÜ118	Visual Thinking with Concepts	3+0	3.0
ESTÜ119	Flute	3+1	3.0
ESTÜ120	Solfege	3+1	3.0
ESTÜ121	Piano	3+1	3.0
ESTÜ122	Guitar	3+1	3.0
FRA175 (Fra)	French I	3+0	3.0
FRA176 (Fra)	French II	3+0	3.0
İKT151 (Eng)	Economics	3+0	3.0
İKT151	Economics	3+0	3.0
İKT213	Mathematical Economics	3+0	4.5
İLT408	Effective and Pleasant Speaking Techniques	2+0	2.5
İNG325 (Eng)	Academic English III	3+0	3.0
İNG326 (Eng)	Academic English IV	3+0	3.0
İNG425 (Eng)	Academic English V	3+0	3.0
İNG426 (Eng)	Academic English VI	3+0	3.0
İŞL101	Introduction to Business	3+0	4.5
İŞL101 (Eng)	Introduction to Business	3+0	4.5
İŞL421	Entrepreneurship	2+0	3.0
İŞL459 (Eng)	Project Management	2+0	5.0
MUH302	Analysis of Financial Reports	3+0	4.5
MÜZ155	Turkish Folk Music	2+0	2.0
MÜZ157	Traditional Turkish Art Music	2+0	2.0
PZL211 (Eng)	Principles of Marketing	3+0	5.0
PZL453 (Eng)	Marketing Research	3+0	4.5
SAN155	Hall Dances	0+2	2.0
SNT155	History of Art	2+0	2.0
SOS155	Folkdance	2+0	2.0
THU203	Community Services	0+2	3.0
TÜR120	Turkish Sign Language	3+0	3.0

Area Elective Courses

ARY202	Research Techniques	3+0	5.0
BİL801	Object Oriented Programming	4+0	4.0
İKT460	Financial Econometrics	3+0	4.5
İKT482	Econometrics II	4+0	6.0

İST228	Advanced Operation Research	3+0	4.5
İST243	Exploratory Data Analysis	2+0	3.0
İST243 (Eng)	Exploratory Data Analysis	2+0	3.0
İST249	Programing with Matlab	4+0	5.0
İST249 (Eng)	Programing with Matlab	4+0	5.0
İST256 (Eng)	Introduction to R Programming	3+0	4.5
İST331	Theoretical Hypothesis Testing	3+0	4.5
İST331 (Eng)	Theoretical Hypothesis Testing	3+0	4.5
İST332 (Eng)	Decision Making Theory	2+0	3.0
İST332	Decision Theory	2+0	3.0
İST334	Experimental Design II	4+0	6.0
İST334 (Eng)	Experimental Design II	4+0	6.0
İST337	Multivariate Time Series	3+0	4.0
İST347	Spreadsheets and Databases	3+0	3.5
İST347 (Eng)	Spreadsheets and Databases	3+0	3.5
İST356	Programming with Python	4+0	5.0
İST358 (Eng)	Database and Management	3+0	4.5
İST412	Fuzzy Logic	2+0	3.0
İST413	Introduction to Artificial Neural Networks	3+0	5.0
İST415	Reliability Analysis	3+0	5.0
İST420	Demography	2+0	3.0
İST425	Risk Management in Actuary	4+0	6.0
İST425 (Eng)	Risk Management in Actuary	4+0	6.0
İST432	Simulation	4+0	6.0
İST432 (Eng)	Simulation	4+0	6.0
İST438 (Eng)	Machine Learning Methods and Applications	3+0	4.5
İST452	Multivariate Statistics II	4+0	6.0
İST452 (Eng)	Multivariate Statistics II	4+0	6.0
MAT208	Differential Equations	3+0	4.5
MAT410	Game Theory	3+0	5.0
NÜM308	Numerical Analysis I	2+2	5.0
TKY302	Quality Control	3+0	4.5
TKY302 (Eng)	Quality Control	3+0	4.5

BUSINESS ANALYTICS MINOR PROGRAM

DEPARTMENT OF CHEMISTRY (30% ENGLISH)

Chemistry is a basic science that is strongly interrelated with many scientific fields such as physics, biology, engineering, and pharmacy. They overlap extensively with chemistry or depend upon it. Furthermore, the knowledge of chemistry is essential for the development of technology and its applications in many areas. The Department of Chemistry consists of Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry branches. Courses offered by the department concentrate on both the fundamental principles of chemistry and the subjects of the branches. The department has well-equipped research facilities developed over the years by the contributions from Anadolu University as well as using grants of TÜBİTAK and DPT. The department program is designed to prepare students with a background of both chemical theory and practical experience to work in laboratories, do laboratory research, and analyze materials. Our graduate can work as a scientific researcher, a research chemist in research and development, a quality control chemist, and an educator after meeting additional requirements for an education job.

Department Head : Prof.Dr. Filiz YILMAZ
Deputy Department Head : Prof.Dr. Sibel DİLTEMİZ
Deputy Department Head : Assoc. Prof.Dr. Emel ERMİŞ

PROGRAM

I.Semester				II.Semester			
BİY127	Biology for Chemists I	2+0	2.0	BİY128	Biology for Chemists II	2+0	2.0
FİZ107	Physics Laboratory I	0+2	1.5	FİZ108	Physics Laboratory II	0+2	1.5
FİZ107 (Eng)	Physics Laboratory I	0+2	1.5	FİZ108 (Eng)	Physics Laboratory II	0+2	1.5

FİZ129	Physics I	4+0	6.0	FİZ130	Physics II	4+0	6.0
FİZ129 (Eng)	Physics I	4+0	6.0	FİZ130 (Eng)	Physics II	4+0	6.0
KİM121	General Chemistry Laboratory I	0+3	2.0	KİM122	General Chemistry Laboratory II	0+3	2.0
KİM121 (Eng)	General Chemistry Laboratory I	0+3	2.0	KİM122 (Eng)	General Chemistry Laboratory II	0+3	2.0
KİM133	General Chemistry I	5+0	6.0	KİM134	General Chemistry II	5+0	6.0
KİM133 (Eng)	General Chemistry I	5+0	6.0	KİM134 (Eng)	General Chemistry II	5+0	6.0
MAT199 (Eng)	Calculus I	5+1	5.5	MAT196 (Eng)	Calculus II	5+1	5.5
MAT199	Calculus I	5+1	5.5	MAT196	Calculus II	5+1	5.5
TÜR125	Turkish Language I	2+0	2.0	TÜR126	Turkish Language II	2+0	2.0
	Seçmeli Ders	--	5.0		*Seçmeli Ders*	--	5.0
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			30.0				30.0

III.Semester

IV.Semester

KİM221	Analytical Chemistry Laboratory I	0+6	3.0	KİM222	Analytical Chemistry Laboratory II	0+6	3.0
KİM221 (Eng)	Analytical Chemistry Laboratory I	0+6	3.0	KİM222 (Eng)	Analytical Chemistry Laboratory II	0+6	3.0
KİM257	Inorganic Chemistry I	4+0	5.0	KİM240	Instrumental Analysis I	3+0	4.0
KİM257 (Eng)	Inorganic Chemistry I	4+0	5.0	KİM276	Analytical Chemistry II	4+0	5.0
KİM275	Analytical Chemistry I	4+0	5.0	KİM276 (Eng)	Analytical Chemistry II	4+0	5.0
KİM275 (Eng)	Analytical Chemistry I	4+0	5.0	KİM278 (Eng)	Organic Chemistry II	4+0	5.0
KİM277 (Eng)	Organic Chemistry I	4+0	4.0	KİM278	Organic Chemistry II	4+0	5.0
KİM277	Organic Chemistry I	4+0	4.0	KİM334	Inorganic Chemistry II	4+0	5.0
TAR165	Atatürk's Principles and History of Turkish Revolution I	2+0	2.0	KİM334 (Eng)	Inorganic Chemistry II	4+0	5.0
	Seçmeli Ders	--	11.0	TAR166	Atatürk's Principles and History of Turkish Revolution II	2+0	2.0
					Seçmeli Ders	--	6.0
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			30.0				30.0

V.Semester

VI.Semester

KİM321 (Eng)	Organic Chemistry Laboratory I	0+4	4.0	KİM322 (Eng)	Organic Chemistry Laboratory II	0+4	4.0
KİM321	Organic Chemistry Laboratory I	0+4	4.0	KİM322	Organic Chamistry Laboratory II	0+4	4.0
KİM325	Inorganic Chemistry Laboratory I	0+3	4.0	KİM324	Physical Chemistry Laboratory I	0+3	4.0
KİM325 (Eng)	Inorganic Chemistry Laboratory I	0+3	4.0	KİM326	Inorganic Chemistry Laboratory II	0+3	4.0
KİM337 (Eng)	Organic Chemistry III	4+0	6.0	KİM326 (Eng)	Inorganic Chemistry Laboratory II	0+3	4.0
KİM337	Organic Chemistry III	4+0	6.0	KİM346	Physical Chemistry II	3+0	5.0
KİM343	Instrumental Analysis II	3+0	4.0	KİM358	Instrumental Analysis III	4+0	4.0
KİM345	Physical Chemistry I	3+0	5.0	KİM358 (Eng)	Instrumental Analysis III	4+0	4.0
KİM359	Literature Searching	1+0	1.0		*Seçmeli Ders*	--	9.0
	Seçmeli Ders	--	6.0				
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			30.0				30.0

VII.Semester				VIII.Semester			
KİM401 (Eng)	Biochemistry I	3+0	3.0	KİM402 (Eng)	Biochemistry II	3+0	3.0
KİM401	Biochemistry I	3+0	3.0	KİM402	Biochemistry II	3+0	3.0
KİM409	Chemistry in Industry	3+0	4.0	KİM408	Atom and Molecular Chemistry	2+0	2.0
KİM423	Industrial Chemical Laboratory	0+4	3.0	KİM412	Biochemistry Laboratory	0+3	3.0
KİM435	Physical Chemistry III	4+0	4.0	KİM425	Physical Chemistry Laboratory II	0+3	3.0
KİM435 (Eng)	Physical Chemistry III	4+0	4.0	KİM425 (Eng)	Physical Chemistry Laboratory II	0+3	3.0
KİM447	Instrumental Analysis Laboratory I	0+4	3.0	KİM448	Instrumental Analysis Laboratory II	0+4	3.0
	Mesleki Seçmeli Ders	--	10.0		*Mesleki Seçmeli Ders*	--	13.0
	Seçmeli Ders	--	3.0		*Seçmeli Ders*	--	3.0
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			30.0				30.0

Elective Courses

ALM175 (Ger)	German I	3+0	3.0
ALM176 (Ger)	German II	3+0	3.0
BEÖ155	Physical Education	2+0	2.0
BİL425	Computer Assisted Chemical Calculations	2+0	3.0
BİY461	Biotechnology	2+0	3.0
ESTÜ101	Introduction to University Life	0+1	2.0
ESTÜ111	Volunteering Works	1+2	4.0
ESTÜ112	Cyber Security for Everyone	2+0	2.0
ESTÜ113	Design Thinking	3+0	3.0
ESTÜ114	Visual Thinking	3+0	3.0
ESTÜ115	Photographic Viewpoint	2+1	3.0
ESTÜ116	Computer Aided Design I	3+0	3.0
ESTÜ117	Computer Aided Design II	3+0	3.0
ESTÜ118	Visual Thinking with Concepts	3+0	3.0
ESTÜ119	Flute	3+1	3.0
ESTÜ120	Solfege	3+1	3.0
ESTÜ121	Piano	3+1	3.0
ESTÜ122	Guitar	3+1	3.0
FRA175 (Fra)	French I	3+0	3.0
FRA176 (Fra)	French II	3+0	3.0
İNG325 (Eng)	Academic English III	3+0	3.0
İNG326 (Eng)	Academic English IV	3+0	3.0
İNG425 (Eng)	Academic English V	3+0	3.0
İNG426 (Eng)	Academic English VI	3+0	3.0
İŞL475	Techno-Entrepreneurship	3+0	4.0
KİM209	Mathematical Methods for Chemistry	2+0	3.0
KİM215	Environnant Problems	2+0	3.0
KİM217	Basics About Safe Working Techniques in Chemistry Laboratories	2+0	3.0
KİM218	Radiation in Daily Life	2+0	3.0
KİM259	History of Chemistry	2+0	3.0
KİM280	Glass Chemistry and Its Applications	2+1	3.0
KİM305	Water and Wastewater Analyses	2+0	3.0
KİM314	Textile Chemistry and Its Applications	1+2	3.0
KİM315	The Chemistry of Ceramics	2+0	3.0
KİM316	Drugs	2+0	3.0
KİM318	The Extraordinary Chemistry of Ordinay Things	2+0	3.0
KİM331	Analysis Methods in Atomic Absorption	1+2	3.0
KİM336	Surface and Thermal Analysis Methods	1+2	3.0
KİM338	X-Ray Diffraction Analysis Techniques	1+2	3.0
KİM339	Inorganic Technologies	2+0	3.0
KİM341	Green Organic Chemistry	2+0	3.0

KİM347	Food Chemistry and Technology	2+0	3.0
KİM348	Colour Chemistry and Synthesis Methods	2+0	3.0
KİM349	Structure Characterization of Organic Compounds	2+0	3.0
KİM350	Introduction to Stereochemistry	2+0	3.0
KİM353	Laboratory Accreditation	2+0	3.0
KİM354	Food Safety and Management Systems	2+0	3.0
KİM355	Hazardous Materials of Chemical and Safety I	2+0	3.0
KİM356	Hazardous Materials of Chemical and Safety II	2+0	3.0
KİM357	Introduction to Adsorption	2+0	3.0
KİM360	Introduction to Polymer Chemistry	2+0	3.0
KİM415	Introduction to Heterocyclic Chemistry	2+0	3.0
KİM419	Dyestuff Chemistry	2+0	3.0
KİM427	Analysis Techniques in Gas Chromatografi	1+2	3.0
KİM429	Chemistry of Main Group Elements	2+0	3.0
KİM430	Biotechnological Methods	2+0	3.0
KİM432	Organic Synthesis	2+0	3.0
KİM433	The Seperation Techniques in Inorganic Chemistry	2+0	3.0
KİM434 (Eng)	Coordination Chemistry	2+0	3.0
KİM434	Coordination Chemistry	2+0	3.0
KİM437	Bioaffinity Chromatography	2+0	3.0
KİM438	Analysis Technics of Liquid Chromatography	1+2	3.0
KİM439	Work and Worker Safety for Chemists	2+0	3.0
KİM440	Polymer Technology	2+0	3.0
KİM444	Forensic Chemistry	2+0	3.0
KİM445	Introduction to Archaeological Chemistry	2+0	3.0
KİM446	Natural Polymeric Materials	2+0	3.0
KİM450	Asymmetric Organic Synthesis Introduction	2+0	3.0
KİM452	Bioinorganic Chemistry	2+0	3.0
KİM453	Chemistry and Technology of Paints	2+0	3.0
KİM454	Chemistry of Colloids	2+0	3.0
KİM455	Applied Nuclear Magnetic Resonance Spectroscopy Technics	2+0	3.0
KİM456	Chemistry of Cosmetics	2+0	3.0
MÜZ151	Short History of Music	2+0	3.0
MÜZ155	Turkish Folk Music	2+0	2.0
MÜZ157	Traditional Turkish Art Music	2+0	2.0
SAĞ222	First Aid	2+1	3.0
SAN155	Hall Dances	0+2	2.0
SNT155	History of Art	2+0	2.0
SOS155	Folkdance	2+0	2.0
THU203	Community Services	0+2	3.0
TKY404	Quality Management System	2+0	3.0
TKY409	Industrial Quality Systems	2+0	3.0
TÜR120	Turkish Sign Language	3+0	3.0

Area Elective Courses

KİM441 (Eng)	Applied Chemistry I	2+4	10.0
KİM441	Applied Chemistry I	2+4	10.0
KİM442 (Eng)	Applied Chemistry II	2+4	13.0
KİM442	Applied Chemistry II	2+4	13.0

DEPARTMENT OF CHEMISTRY (ENG) (ABD STATE UNIVERSTY OF NEW YORK UNIVERSTY AT ALBANY)

Department Head : Prof.Dr. Filiz YILMAZ
Deputy Department Head : Prof.Dr. Sibel DİLTEMİZ
Deputy Department Head : Assoc. Prof.Dr. Emel ERMİŞ

DEPARTMENT OF MATHEMATICS

In the Department of Mathemetics teaching and research are conducted in the following main areas: Analysis, algebra, geometry, topology,applied mathematics and mathematical education.Our students can take elective courses offered by various departments; such as business and administration, economics and social sciences. Therefore they have the opportunity to widen their horizons besides mathematics. Also, promising students are allowed to enroll in a double major or minor program. Our graduates who complete the M.Sc. program- without thesis- of the Institute of Educational Sciences can work as a mathematics teacher at highschools. In addition our graduates can work as a computer scientist, researcher or a strategic planner in public or private sector. Our succesfull graduates can work as a research assistant at Turkish universities or they can pursue an academic career abroad.

Department Head : Prof.Dr. Nülifer ÖZDEMİR
Deputy Department Head : Assoc. Prof.Dr. Mustafa SALTAN
Deputy Department Head : Prof.Dr. Yılmaz DERELİ

PROGRAM

I.Semester

FİZ107	Physics Laboratory I	0+2	1.5	MAT116	Analytic Geometry II	2+2	5.0
FİZ129	Physics I	4+0	6.0	MAT118	Abstract Mathematics II	2+2	5.0
MAT115	Analytic Geometry I	2+2	5.0	MAT196	Calculus II	5+1	5.5
MAT117	Abstract Mathematics I	2+2	5.0	MAT818	Calculus Laboratory II	0+2	2.0
MAT199 (Eng)	Calculus I	5+1	5.5	TÜR126	Turkish Language II	2+0	2.0
MAT199	Calculus I	5+1	5.5		*Seçmeli Ders*	--	7.5
MAT817	Calculus Laboratory I	0+2	2.0		*Yabancı Dil Dersleri II*	--	3.0
TÜR125	Turkish Language I	2+0	2.0				
	Yabancı Dil Dersleri I	--	3.0				
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			30.0				30.0

III.Semester

MAT203	Linear Algebra I	4+0	5.0	MAT204	Linear Algebra II	4+0	5.0
MAT213	Computer Programming I	2+2	5.0	MAT214	Computer Programming II	2+2	5.0
MAT215	Differential Equations I	2+2	5.0	MAT216	Differential Equations II	2+2	5.0
MAT221	Analysis I	4+2	7.0	MAT222	Analysis II	4+2	7.0
TAR165	Atatürk's Principles and History of Turkish Revolution I	2+0	2.0	TAR166	Atatürk's Principles and History of Turkish Revolution II	2+0	2.0
	Seçmeli Ders	--	2.0		*Seçmeli Ders*	--	2.0
	Mesleki Seçmeli Dersler	--	4.0		*Mesleki Seçmeli Dersler*	--	4.0
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			30.0				30.0

V.Semester

MAT321	Complex Analysis I	2+2	5.0	MAT322	Complex Analysis II	2+2	5.0
MAT323	Abstract Algebra I	2+2	5.0	MAT324	Abstract Algebra II	2+2	5.0
MAT325	Metric and Topological Spaces I	2+2	5.0	MAT326	Metric and Topological Spaces II	2+2	5.0
MAT327	Analysis III	4+2	7.0	MAT328	Analysis IV	4+2	7.0
	Seçmeli Ders	--	3.0		*Seçmeli Ders*	--	10.0
	Mesleki Seçmeli Dersler	--	5.0		*Mesleki Seçmeli Dersler*	--	5.0
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			30.0				37.0

VII.Semester

MAT403	Real Analysis I	3+0	5.0	MAT402	Real Analysis II	3+0	5.0
MAT405	Functional Analysis I	3+0	5.0	MAT404	Functional Analysis II	3+0	5.0
MAT437	Mathematics Project	0+3	6.0		*Seçmeli Ders*	--	10.0

MAT437 (Eng)	Mathematics Project	0+3	6.0	*Mesleki Seçmeli Dersler*	--	10.0
	Seçmeli Ders	--	4.0			
	Mesleki Seçmeli Dersler	--	10.0			
			-----			-----
			30.0			30.0

Foreign Language Courses

ALM175 (Ger)	German I	3+0	3.0
ALM176 (Ger)	German II	3+0	3.0
ESTÜ120	Solfege	3+1	3.0
FRA175 (Fra)	French I	3+0	3.0
FRA176 (Fra)	French II	3+0	3.0
İNG187 (Eng)	English I	3+0	3.0
İNG188 (Eng)	English II	3+0	3.0

Elective Courses

BEÖ155	Physical Education	2+0	2.0
BRİ101	Bridge	2+0	3.0
ESTÜ101	Introduction to University Life	0+1	2.0
ESTÜ111	Volunteering Works	1+2	4.0
ESTÜ112	Cyber Security for Everyone	2+0	2.0
ESTÜ113	Design Thinking	3+0	3.0
ESTÜ114	Visual Thinking	3+0	3.0
ESTÜ115	Photographic Viewpoint	2+1	3.0
ESTÜ116	Computer Aided Design I	3+0	3.0
ESTÜ117	Computer Aided Design II	3+0	3.0
ESTÜ118	Visual Thinking with Concepts	3+0	3.0
ESTÜ119	Flute	3+1	3.0
ESTÜ121	Piano	3+1	3.0
ESTÜ122	Guitar	3+1	3.0
FİN305	Financial Mathematics	2+0	3.0
İKT107	Introduction to Economics I	4+0	6.0
İKT108	Introduction to Economics II	4+0	6.0
İKT213	Mathematical Economics	3+0	4.5
İKT309	Monetary Theory	3+0	5.0
İKT310	Monetary Policy	3+0	5.0
İKT322	International Economics	2+0	5.0
İKT324	Financial Institutions and Banking	2+0	3.0
İKT417	Financial Economics I	2+0	3.0
İKT418	Financial Economics II	2+0	3.0
İKT421	Economy of Turkey	2+0	3.0
İNG225 (Eng)	Academic English I	3+0	3.0
İNG226 (Eng)	Academic English II	3+0	3.0
İNG325 (Eng)	Academic English III	3+0	3.0
İNG326 (Eng)	Academic English IV	3+0	3.0
İNG425 (Eng)	Academic English V	3+0	3.0
İNG426 (Eng)	Academic English VI	3+0	3.0
İŞL215 (Eng)	Time Management	1+1	3.0
İŞL215	Time Management	1+1	3.0
MAT365	Creativity and Innovation Management	2+0	2.0
MÜZ151	Short History of Music	2+0	3.0
MÜZ155	Turkish Folk Music	2+0	2.0
SAN155	Hall Dances	0+2	2.0
SNT155	History of Art	2+0	2.0
SOS155	Folkdance	2+0	2.0
THU203	Community Services	0+2	3.0
TÜR120	Turkish Sign Language	3+0	3.0

Area Elective Courses

BİL378	Database Control Systems	2+2	5.0

BİL379	System Analysis and Design	3+0	5.0
BİL429	Object Oriented Programming	2+2	5.0
BİL430	Internet Programming	2+2	5.0
İST201	Statistics	3+0	3.0
İST213	Probability	3+0	3.0
MAT218	Documentation with LaTeX	3+0	5.0
MAT226	Introduction to Graph Theory	3+0	5.0
MAT227	Geometry I	3+0	5.0
MAT228	Geometry II	3+0	5.0
MAT239	Discrete Mathematics	3+0	5.0
MAT239 (Eng)	Discrete Mathematics	3+0	5.0
MAT256 (Eng)	English for Mathematicians	3+0	5.0
MAT256	English for Mathematicians	3+0	5.0
MAT263	Proof Without Words	2+0	3.0
MAT265	Mathematical Softwares	3+0	5.0
MAT267 (Eng)	Mathematics with Models	2+0	3.0
MAT267	Mathematics with Models	2+0	3.0
MAT273 (Eng)	Construction of Number Systems	3+0	5.0
MAT273	Construction of Number Systems	3+0	5.0
MAT309	Advanced Programming	2+2	5.0
MAT310	Selected Topics on Computer	2+2	5.0
MAT311	Numerical Analysis I	3+0	5.0
MAT312	Numerical Analysis II	3+0	5.0
MAT313	Differential Geometry I	3+0	5.0
MAT314	Differential Geometry II	3+0	5.0
MAT315	History of Mathematics I	3+0	5.0
MAT316	History of Mathematics II	3+0	5.0
MAT318	Matrix Analysis	3+0	5.0
MAT318 (Eng)	Matrix Analysis	3+0	5.0
MAT319	Euclidean and Non-Euclidean Geometries	3+0	5.0
MAT406 (Eng)	Geometric Topology	3+0	5.0
MAT406	Geometric Topology	3+0	5.0
MAT407	Uniform Spaces	3+0	5.0
MAT407 (Eng)	Uniform Spaces	3+0	5.0
MAT408 (Eng)	Vector Analysis	3+0	5.0
MAT408	Vector Analysis	3+0	5.0
MAT409	Partial Differential Equations	3+0	5.0
MAT409 (Eng)	Partial Differential Equations	3+0	5.0
MAT410 (Eng)	Game Theory	3+0	5.0
MAT410	Game Theory	3+0	5.0
MAT412	Education of Axiomatic Geometry	3+0	5.0
MAT413	Fourier Analysis	3+0	5.0
MAT413 (Eng)	Fourier Analysis	3+0	5.0
MAT414	Dynamical Systems	3+0	5.0
MAT414 (Eng)	Dynamical Systems	3+0	5.0
MAT417 (Eng)	Calculus of Variations	3+0	5.0
MAT417	Calculus of Variations	3+0	5.0
MAT420	Tensor Analysis	3+0	5.0
MAT422	Continuous Dynamical Systems	3+0	5.0
MAT429	Galois Theory	3+0	5.0
MAT429 (Eng)	Galois Theory	3+0	5.0
MAT430 (Eng)	Linear Differential Equations	3+0	5.0
MAT430	Linear Differential Equations	3+0	5.0
MAT431 (Eng)	Introduction to Number Theory I	3+0	5.0
MAT431	Introduction to Number Theory I	3+0	5.0
MAT432 (Eng)	Introduction to Number Theory II	3+0	5.0
MAT432	Introduction to Number Theory II	3+0	5.0
MAT433 (Eng)	Fractal Geometry I	3+0	5.0
MAT433	Fractal Geometry I	3+0	5.0
MAT434 (Eng)	Fractal Geometry II	3+0	5.0
MAT434	Fractal Geometry II	3+0	5.0
MAT435	Discrete Dynamical Systems	3+0	5.0
MAT436 (Eng)	Introduction to Perturbation Methods	3+0	5.0
MAT436	Introduction to Perturbation Methods	3+0	5.0
MAT452 (Eng)	Applications of Partial Differential Equations	3+0	5.0
MAT452	Applications of Partial Differential Equations	3+0	5.0
MAT453	Linear Programming	3+0	5.0

MAT453 (Eng) Linear Programming 3+0 5.0

COURSE CONTENTS

ALM175 (Ger) German I 3+0 3.0
Greeting and Saying Goodbye; Introducing Yourself and Others; Giving Personal Information About Yourself; Spelling a Word; Counting up to 100; Communicating in Private Life; Telling Profession; Talking About Occupation and Business; Expressing a Problem; Introducing Family; Telling the Time; Planning Events; Making an Appointment; Saying the Names of Foods; Reading the Menu; Ordering in the restaurant; Shopping at the Market; Making A Complaint; Saying the Names of Vehicles; Asking for Address; Understanding Directions; Talking about the Illness; Reading and Writing Dates; Replying to an Invitation; Making Holiday Plans; Understanding and Talking About the Weather Forecast.

ALM176 (Ger) German II 3+0 3.0
Giving Feedback; Making A Suggestion; Asking Questions; Expressing Ideas; Expressing Requests and Fears; Understanding Signs; Giving Directions; Talking about Sports; Reading and Understanding Newspapers; Ordering by Telephone; Preferring a Profession; Talking about Professions; Making a Complaint; Intercultural Communication; Comprehending Instructions for Use; Making Weather Forecast; Reading Literary Texts; Celebrating; Comprehending and Giving Recipe; Identify Things; Comprehending Adventure Stories and Movies.

ARY202 Research Techniques 3+0 5.0
Science: Definition of science, Scientific research, Technical approaches in scientific research; Research: Stages of a research, Types of research, Data collection techniques in research; Question: Definition of question, Types of question, Question forms in research, Preparation of the forms using computers: Analysis of the results: Evaluation of question forms using computer, Statistical analysis of the research results, Computer output of research results; Report writing; An Application of Research Planning.

ARY411 Research Methods in Physics 2+0 3.0
Scientific Research and Other Scientific Activities: Conference, Symposium, Colloquim, Congress, Seminar, Panel, Summer school; Selection of Subject for Research; Methods of Knowledge Collection for Research ; Planning of Research; Experimental Set-up; Preparation of any Scientific Paper; Preparation of any Thesis, Preparation of Conference Papers and Oral Presentation; Physical Measurement and Significant Numbers; Uncertainty; Sensitivity; Graphic Analysis; The Method of Least Square Means and Correlation; Characterisation Methods in Physics: X ray diffraction and fluorescence method, Thermal analysis methods, Chromatographic methods, Electron microscophic methods, Other characterisation methods.

BEÖ155 Physical Education 2+0 2.0
Definition of Physical Education and Sports; Aims, Disadvantages of Inactive Life; Various Activities for Physical Education; Recreation; Human Physiology; First Aid; Sports Branches: Definition, Rules and Application; Keep Fit Programs.

BİL110 Computer Programming 2+0 3.0
Word Processing Software Using: Automatic writing control, Moving and copying of text, Forming with Tool Bar and Menu Commands; Spreadsheet Software Using: Writing Formula, Automatic adding of sum function, Forming Tables, Drawing Graphics, Text printing; Matlab (Mathematics and graphic programming language): Using Menus, Matlab basics, Matrix operations, Vectors, Data analysis, Matrix functions, Graphics.

BİL168 Computer Programming 4+0 5.0
Introduction to C Programming Language; Basic Elements of C Programming Language; Variables and Values; Simple Input/Output Operations; Arithmetic Operators; Logical Operators; Control Structures; Loops; Arrays; Functions; Pointers; Operations of Files.

BİL213 Computer Using 2+0 3.0
Ms PowerPoint 97: Smart wizard, Slide, Presentation, Creating a new slide, Changing slides in order, Changing and adding text on slide, Changing picture scale, Saving a main topic, Creating and adding graphs, Setting the transmission and duration times of slides, Applying background to slides, Animation of text in slide, Electronic presentation; the Internet: E-mail, Worldwide web, Chat on the internet (Chat by mirc, ICQ), Microsoft internet explorer, Netscape communicator, E-mailing, Frequently visited addresses.

BİL308 Advanced Programming 2+0 3.0
Introduction to Programming: General structure of the programming languages, Mathematical operations in the computer programs, Comparison operations, Logical operations; General structure of C/C++ Programming Language: Data types, The parts of a C/C++ program, Data input and output commands; Loop Commands in C/C++: Loop commands and their usage in the program, Creating arrays, Applications in physics; Decision (Comparison) Commands in C/C++: Comparison

commands and their usage in the program, The usage of comparison commands with loop commands, Applications in physics.

BİL378 Database Control Systems 2+2 5.0

Database, database management systems, basic concepts, database architecture, external, conceptual, and internal levels, data independence, data models, dependencies among entities, normal forms, design criteria, entity - relationship database systems, data definition, data manipulation and query languages, relational processes, relational algebra and examples of relational query languages, operational requirements, security, integrity, synergies, performance.

BİL379 System Analysis and Design 3+0 5.0

System functions and tools, introducing problem and problem solving rules, system development life-cycle, analyzing tools and techniques, modeling of an existing or a new information system using data flow schemas, defining data type and information requirements in data dictionary, system design and its application, computer inputs, outputs, controls and files, system development steps and system analysis, feasibility study, management function, data and information concepts, specification of information requirements, system analysis tools, classification of information systems, computer supported software programming tools.

BİL425 Computer Assisted Chemical Calculations 2+0 3.0

Creating 2D and 3D models of organic, inorganic and heterocyclic compounds with suitable chemistry software; Estimation of electron densities and thermodynamic properties of these compounds by means of MOPAC, Gaussian 98 and Chemoffice 2000 soft wares.

BİL429 Object Oriented Programming 2+2 5.0

Investigation to The Object Oriented Programming; Bringing of The Object Oriented Programming; Concepts of Class, Object, Event, Property and Method; Data Storage;Data Abstraction; Dynamic Connection; Inheritance; General Properties of Scheduled Programming Language; Variables; Control Structures, Loop; Concept of Block; Use of Classes; Examples of The Object Oriented Programming.

BİL430 Internet Programming 2+2 5.0

The Internet Protocol and Concepts of Internet; Web Site Development with HTML/JavaScript; Web Servers and Basics of Web Servers; Programming with PHP or Other Scripting Languages; Web Design with Graphics and Animation Software; An Introduction to Databases; Database Management Systems; SQL Commands and Applications; Publishing Databases on the Web;Building a Sample Database Application on the Web;

BİL801 Object Oriented Programming 4+0 4.0

Introduction to C++ Programming Language; Inline Functions; Function Overloading; Function Templates; Concepts of Class and Object; Constructors; Destructors; Friend Functions and Friend Classes; Const Objects and Const Member Functions; C++ Operator Overloading; C++ Inheritance; C++ Virtual Functions; Polymorphism.

BİL802 Visual Programming 4+0 4.0

Introduction to Visual Basic Programming; Basic Concepts and Definitions; Constants and Arithmetic Operations; Variable and Data Types; Visual Basic Work Environment; Cases; Methods; Properties; Control Structures; Loops; Arrays; Functions; Drawing Figure in Visual Basic.

BİY103 Biomathematics 3+0 3.0

Set of Numbers: Natural numbers, Integers, Rational numbers, Real numbers, Equations and Inequalities: First and Second Order Equations and Inequalities; Functions: Definition of function, Functions and their Graphs in Coordinate System, Inverse functions, Polynomial functions and their applications, The trigonometric functions, Polar Coordinates, Polar graphs, Exponential and Logarithmic Functions and their applications; Sequences and Series; Definition of sequence and the limit of a sequence, the Fibonacci Sequence, Series; Limit of functions, The Derivative, Definition of the derivative, Differentiation Rules, Applications of derivatives

BİY104 Biophysics 3+0 4.0

Measurements and Physical Quantities: Systems of units; Perpendicular Coordinate System; Scalar and Vectoral Quantities; Kinematics: Velocity, Acceleration; Dynamics: Force, Newton's Laws, Maos, Friction; Fluids: Density, Pressure, Pascal's Principle, Archimedes's Principal, Viscosity; Waves and Acoustics; 'Geometrical Optics, What is the light?; Reflection and Refraction; Huysens Principal; Mirrors and Lenses; Eye and Optical Defects; Optical Tools; Physical Optics: The optics of waves, Diffraction and ference, X-rays; Radioactivity; Heat and Temperature: Specific heat, Expansion, Heat transfer

BİY106 Applied Biology 2+0 3.0

Biological fuel production: ethanol, methane, hydrogen; Biological weapons and bioterrorism; Biopolymers; Biotransformation and biocatalysis; Biofertilizer; Biodegradation; Bioremediation; Biopesticides; Biopharmaceuticals: drugs, vaccines, hormones and other proteins; Gene therapy; Genetic engineering of animals; Genetically modified plants.Biological fuel production: ethanol, methane, hydrogen; Biological weapons and bioterrorism; Biopolymers; Biotransformation and biocatalysis; Biofertilizer; Biodegradation; Bioremediation; Biopesticides; Biopharmaceuticals: drugs, vaccines, hormones and other proteins; Gene therapy; Genetic engineering of animals; Genetically modified plants.

BİY106 (Eng) Applied Biology 2+0 3.0

Biological fuel production: ethanol, methane, hydrogen; Biological weapons and bioterrorism; Biopolymers; Biotransformation and biocatalysis; Biofertilizer; Biodegradation; Bioremediation; Biopesticides; Biopharmaceuticals: drugs, vaccines, hormones and other proteins; Gene therapy; Genetic engineering of animals; Genetically modified plants.Biological fuel production: ethanol, methane, hydrogen; Biological weapons and bioterrorism; Biopolymers; Biotransformation and biocatalysis; Biofertilizer; Biodegradation; Bioremediation; Biopesticides; Biopharmaceuticals: drugs, vaccines, hormones and other proteins; Gene therapy; Genetic engineering of animals; Genetically modified plants.

BİY117 General Biology I 4+0 6.0

Introduction to Biology: Branches of biology, What is life, Research methods in biology, Development of biology in the world, Development of biology in Turkey, Organisms, Base of biology, Opinions on the beginning of the living things: Chemistry of life, Inorganic substances, Organic substances; Structure and function of the cell: Cell theory, Cell types, Animal cell, Plant cell, Cell structure, Functions of cell, Biochemistry of cell membrane, Cell division; Life in cell: Metabolic pathways, Chemical reactions in the cell, Energy, Enzymes, Variations of nourishment

BİY118 General Biology II 4+0 6.0

Reproduction: Asexual and sexual reproduction, Reproduction in plants, Reproduction in animals, Meiosis and gametogenesis, Fertilization; Developing: Segmentation and gastrulation, Differentiation, Histogenesis and organogenesis, Regeneration, Metamorphosis; Heredity: Genes and alleles, Co-domination, Semi-domination; Sex-linked genetics, Multiple alleles, Genes and the environment, Molecular basis of heredity, Population genetics; Evolution: Organic evolution, Crude materials of evolution, Factors forming evolution, Adaptation, the origin of species, Evidence for evolution; Ecology: Environment and importance of environment.

BİY119 General Biology Laboratory I 0+4 3.0

Microscope usage in General Biology Laboratory; The Cell: Prokaryotic and eukaryotic cells, Plant and animal cells; Organic Compounds: Carbonhydrate, protein and lipid identification; Cell Membrane: Characteristics, Substance transport, Cytoplasmic movements; Coloured Substances: Plastids, Colour pigments in animals; Ergastic Substances: Starch, Protein, Crystal; Meristematic Tissues in Plants: Characteristics, Mitosis, Mitosis preparation, Investigation of mitosis phases; Permanent Tissues in Plants: Ground tissue, Protective tissue, Collenchyma and sclerenchyma tissues, Vascular tissue, Secretory tissue; Plant Systematics; Microorganisms.

BİY120 General Biology Laboratory II 0+4 3.0

Protists: Preparation of protist cultures, Investigation of protists, Reproduction and development of animals, Investigation of Meiosis, Investigation of the frog spermae, Investigation of segmentation, Investigation of animal tissues: Epithelium, connective tissue, cartilage, bone, muscle, nervous tissue and blood; Investigation and dissection of selected samples from animal taxons, Investigation of Planaria, Investigation of parasitic Lancet Fluke (Dicrocoelium lanceolatum), Dissection of the earthworm (Lumbricus sp.), Dissection of oriental cockroach (Blatta orientalis), Dissection of frog (Rana ridibunda)

BİY127 Biology for Chemists I 2+0 2.0

Chemical Content of Organisms; Eligibility of Water and Environment for Organisms; Carbon and Molecular Diversity of Living Organisms; Structure and Function of Macromolecules; Introduction to Metabolism; Structure of The Cell: Nucleus and ribosomes, Inner-membrane system, Other membrane-surrounded organelles, Cytoskeleton, Cell surface and link regions; Membrane Structure and Function; Stem Cells: Stem cell types, Stem cell research; Communication Between Cells; The Cell Cycle: Cell division, Control mechanisms of the cell cycle; Meiosis and Sexual Life Cycles.

BİY128 Biology for Chemists II 2+0 2.0

Chromosomal Basis of Inheritance; The Molecular Basis of Inheritance; Prokaryotes and the Origins of Metabolic Diversity; Plant Structure and Function; Introduction to Animal Structure and Function; Animal Nutrition: An overview of Food Processing, Mammalian digestive system; Circulation and Gas Exchange; Defense of the Body: Non-specific defenses against infection, Spesifik immunity, Immune responses; Regulation of Internal Environment: Body temperature regulation, Water balance and excretion of waste; Introduction to Regulatory Systems.

BİY137 Introduction to Molecular Biology 2+0 2.0

Definition and Scope of Molecular Biology; History of Molecular Biology; Hierarchy of Intracellular Organization of Various Molecules; Molecular Base of Life; The Suitability of Some Chemical Elements and Compounds for Biological

Structures; Chemical Reactions in the Cell; Energy and its Diversity; Inorganic Substances; Organic Substances: Polypeptides, Carbohydrates, Lipids, Nucleic acids and enzymes; Sequence Isomer in Protein Chains; Cell and Structural Organization; Life Events in the Cell: Polymerization of macromolecules, Photosynthesis, Aerobic and anaerobic respiration.Definition and Scope of Molecular Biology; History of Molecular Biology; Hierarchy of Intracellular Organization of Various Molecules; Molecular Base of Life; The Suitability of Some Chemical Elements and Compounds for Biological Structures; Chemical Reactions in the Cell; Energy and its Diversity; Inorganic Substances; Organic Substances: Polypeptides, Carbohydrates, Lipids, Nucleic acids and enzymes; Sequence Isomer in Protein Chains; Cell and Structural Organization; Life Events in the Cell: Polymerization of macromolecules, Photosynthesis, Aerobic and anaerobic respiration.

BİY137 (Eng) Introduction to Molecular Biology 2+0 2.0

Definition and Scope of Molecular Biology; History of Molecular Biology; Hierarchy of Intracellular Organization of Various Molecules; Molecular Base of Life; The Suitability of Some Chemical Elements and Compounds for Biological Structures; Chemical Reactions in the Cell; Energy and its Diversity; Inorganic Substances; Organic Substances: Polypeptides, Carbohydrates, Lipids, Nucleic acids and enzymes; Sequence Isomer in Protein Chains; Cell and Structural Organization; Life Events in the Cell: Polymerization of macromolecules, Photosynthesis, Aerobic and anaerobic respiration.Definition and Scope of Molecular Biology; History of Molecular Biology; Hierarchy of Intracellular Organization of Various Molecules; Molecular Base of Life; The Suitability of Some Chemical Elements and Compounds for Biological Structures; Chemical Reactions in the Cell; Energy and its Diversity; Inorganic Substances; Organic Substances: Polypeptides, Carbohydrates, Lipids, Nucleic acids and enzymes; Sequence Isomer in Protein Chains; Cell and Structural Organization; Life Events in the Cell: Polymerization of macromolecules, Photosynthesis, Aerobic and anaerobic respiration.

BİY139 Microscopy and Preparation Techniques 1+2 3.0

History of Microscope; Light and Properties I: Reflection, Refraction, Polarization; Light and Properties II: Diffraction, Induction of fluorescence, Absorption-Transmission; Light Microscope and Working Principles I: Simple light microscope, Dark field microscope, Phase-contrast microscope, Inverted microscope; Types of Light Microscopy and Working Principles II: Fluorescence microscope, Confocal microscope; Electron Microscopy; Simple Preparation Techniques; Histological Preparation Techniques; Electron Microscopy Preparation Techniques; Animal Cell Culture Techniques; Immunohistochemistry Methods: Direct and indirect labeling; ELIZA Techniques.

BİY213 Cryptogams 2+0 2.5

Definition of Plant Taxonomy; The History of Taxonomical Studies; Classification Systems; Nomenclature and Rules: Binominal nomenclature, Reasons for nomenclature, Methods; Herbarium Tecniques in Cryptogams: Algae, Mosses, Ferns, Fungi; Classification in Cryptogams: Cyanophyta; Euglenophyta; Pyrrophyta; Curysophyta; Chlorophyta; Phaeophyta; Rhodophyta; Biology and Classification of Bryophyta and Pteridophyta.

BİY215 Microbiology I 2+0 2.5

Microorganisms in Nature; History of Microbiology; Cell Chemistry; Atoms, Molecules and Chemical Bonding, Water and its Importance, Carbohydrates, Proteins, Fatty Acids and Lipids, Nucleic Acids; Cell and Cell Structure; Prokaryotic Cell Structure, Eukaryotic Cell Structure, Importance of being small, Cell Membrane, Cell Wall, Growth in Microorganisms, Nutrition and Metabolism in Microorganisms: Autotrophy Microorganisms, Heterotopy Microorganisms, Enzymes, Energy, Fermentation, Respiration, Anaerobic Respiration, Biosynthesis; Microbial Growth Control.Microorganisms in Nature; History of Microbiology; Cell Chemistry; Atoms, Molecules and Chemical Bonding, Water and its Importance, Carbohydrates, Proteins, Fatty Acids and Lipids, Nucleic Acids; Cell and Cell Structure; Prokaryotic Cell Structure, Eukaryotic Cell Structure, Importance of being small, Cell Membrane, Cell Wall, Growth in Microorganisms, Nutrition and Metabolism in Microorganisms: Autotrophy Microorganisms, Heterotopy Microorganisms, Enzymes, Energy, Fermentation, Respiration, Anaerobic Respiration, Biosynthesis; Microbial Growth Control.

BİY215 (Eng) Microbiology I 2+0 2.5

Microorganisms in Nature; History of Microbiology; Cell Chemistry; Atoms, Molecules and Chemical Bonding, Water and its Importance, Carbohydrates, Proteins, Fatty Acids and Lipids, Nucleic Acids; Cell and Cell Structure; Prokaryotic Cell Structure, Eukaryotic Cell Structure, Importance of being small, Cell Membrane, Cell Wall, Growth in Microorganisms, Nutrition and Metabolism in Microorganisms: Autotrophy Microorganisms, Heterotopy Microorganisms, Enzymes, Energy, Fermentation, Respiration, Anaerobic Respiration, Biosynthesis; Microbial Growth Control.Microorganisms in Nature; History of Microbiology; Cell Chemistry; Atoms, Molecules and Chemical Bonding, Water and its Importance, Carbohydrates, Proteins, Fatty Acids and Lipids, Nucleic Acids; Cell and Cell Structure; Prokaryotic Cell Structure, Eukaryotic Cell Structure, Importance of being small, Cell Membrane, Cell Wall, Growth in Microorganisms, Nutrition and Metabolism in Microorganisms: Autotrophy Microorganisms, Heterotopy Microorganisms, Enzymes, Energy, Fermentation, Respiration, Anaerobic Respiration, Biosynthesis; Microbial Growth Control.

BİY216 Microbiology II 2+0 2.5

Viruses: Viral Replication, Nomenclature and Taxonomy of Viruses; Algae; Protozoa; Fungi; Bacteria; Species concept in Bacteria, Identification Methods of Bacteria, Archaebacteria, Eubacteria; Introduction to Microbial Genetics: Genetics in

Prokaryotic and Eukaryotic Microorganisms, Mutations, Extra chromosomal Inheritance; Immunology: Antigen and Antibodies, Microbial Antigens, Immune Response Polyclonal and Monoclonal Antibodies, Interaction of Antigen and Antibody.Viruses: Viral Replication, Nomenclature and Taxonomy of Viruses; Algae; Protozoa; Fungi; Bacteria; Species concept in Bacteria, Identification Methods of Bacteria, Archaebacteria, Eubacteria; Introduction to Microbial Genetics: Genetics in Prokaryotic and Eukaryotic Microorganisms, Mutations, Extra chromosomal Inheritance; Immunology: Antigen and Antibodies, Microbial Antigens, Immune Response Polyclonal and Monoclonal Antibodies, Interaction of Antigen and Antibody.

BİY216 (Eng) Microbiology II 2+0 2.5

Viruses: Viral Replication, Nomenclature and Taxonomy of Viruses; Algae; Protozoa; Fungi; Bacteria; Species concept in Bacteria, Identification Methods of Bacteria, Archaebacteria, Eubacteria; Introduction to Microbial Genetics: Genetics in Prokaryotic and Eukaryotic Microorganisms, Mutations, Extra chromosomal Inheritance; Immunology: Antigen and Antibodies, Microbial Antigens, Immune Response Polyclonal and Monoclonal Antibodies, Interaction of Antigen and Antibody.Viruses: Viral Replication, Nomenclature and Taxonomy of Viruses; Algae; Protozoa; Fungi; Bacteria; Species concept in Bacteria, Identification Methods of Bacteria, Archaebacteria, Eubacteria; Introduction to Microbial Genetics: Genetics in Prokaryotic and Eukaryotic Microorganisms, Mutations, Extra chromosomal Inheritance; Immunology: Antigen and Antibodies, Microbial Antigens, Immune Response Polyclonal and Monoclonal Antibodies, Interaction of Antigen and Antibody.

BİY217 Microbiology Laboratory I 0+2 2.0

Basic Laboratory Equipments in Microbiology Laboratory; Sterilization and Disinfection; Microbiological Media and their Preparations; Staining Bacteria; Preparation Microscopic Slide, Simple staining, Negative staining, Gram staining, Endospor staining; Bacterial Motility; Measurement of Bacterial Size; Determination of Live Cell Number of Bacteria; Growth Requirements of Microorganisms; Pure Culture Techniques; Cultural Aspects of the Microorganisms.Basic Laboratory Equipments in Microbiology Laboratory; Sterilization and Disinfection; Microbiological Media and their Preparations; Staining Bacteria; Preparation Microscopic Slide, Simple staining, Negative staining, Gram staining, Endospor staining; Bacterial Motility; Measurement of Bacterial Size; Determination of Live Cell Number of Bacteria; Growth Requirements of Microorganisms; Pure Culture Techniques; Cultural Aspects of the Microorganisms.

BİY217 (Eng) Microbiology Laboratory I 0+2 2.0

Basic Laboratory Equipments in Microbiology Laboratory; Sterilization and Disinfection; Microbiological Media and their Preparations; Staining Bacteria; Preparation Microscopic Slide, Simple staining, Negative staining, Gram staining, Endospor staining; Bacterial Motility; Measurement of Bacterial Size; Determination of Live Cell Number of Bacteria; Growth Requirements of Microorganisms; Pure Culture Techniques; Cultural Aspects of the Microorganisms.Basic Laboratory Equipments in Microbiology Laboratory; Sterilization and Disinfection; Microbiological Media and their Preparations; Staining Bacteria; Preparation Microscopic Slide, Simple staining, Negative staining, Gram staining, Endospor staining; Bacterial Motility; Measurement of Bacterial Size; Determination of Live Cell Number of Bacteria; Growth Requirements of Microorganisms; Pure Culture Techniques; Cultural Aspects of the Microorganisms.

BİY218 Microbiology Laboratory II 0+2 2.0

Viruses: Isolation of Bacteriophages, Plaque counting; Fungi: Macroscopic and microscopic analysis of the fungus sample, Yeasts, Molds, Plant parasitic fungi; Antimicrobial effects of some chemical substances; Determination of Minimal Inhibitory Concentration; Isolation of Streptomycin resistant mutants; Immunology; Environmental microbiology: Soil microbiology, Air microbiology, Water microbiology; Extemophilic microorganisms.Viruses: Isolation of Bacteriophages, Plaque counting; Fungi: Macroscopic and microscopic analysis of the fungus sample, Yeasts, Molds, Plant parasitic fungi; Antimicrobial effects of some chemical substances; Determination of Minimal Inhibitory Concentration; Isolation of Streptomycin resistant mutants; Immunology; Environmental microbiology: Soil microbiology, Air microbiology, Water microbiology; Extemophilic microorganisms.

BİY218 (Eng) Microbiology Laboratory II 0+2 2.0

Viruses: Isolation of Bacteriophages, Plaque counting; Fungi: Macroscopic and microscopic analysis of the fungus sample, Yeasts, Molds, Plant parasitic fungi; Antimicrobial effects of some chemical substances; Determination of Minimal Inhibitory Concentration; Isolation of Streptomycin resistant mutants; Immunology; Environmental microbiology: Soil microbiology, Air microbiology, Water microbiology; Extemophilic microorganisms.Viruses: Isolation of Bacteriophages, Plaque counting; Fungi: Macroscopic and microscopic analysis of the fungus sample, Yeasts, Molds, Plant parasitic fungi; Antimicrobial effects of some chemical substances; Determination of Minimal Inhibitory Concentration; Isolation of Streptomycin resistant mutants; Immunology; Environmental microbiology: Soil microbiology, Air microbiology, Water microbiology; Extemophilic microorganisms.

BİY219 Cryptogams Laboratory 0+2 2.0

Practices in Cryptogam Laboratory; Cyanobacteria: Commonly Encountered Samples in Local Environment and Turkey; Crysophyta, Chlorophyta, Phaeophyta, Rhodophyta: Commonly Encountered Samples in Local Environment and Turkey; Bryophyta: Commonly Encountered Samples in Local Environment and Turkey of Anthocerotopsida, Marchantiopsida and

Bryopsida; Pteridophyta: Commonly Encountered Samples in Local Environment and Turkey; Examination of Lichen Samples.

BİY220 Seed Plants 2+0 2.5

General Taxonomic Principles; Plant nomenclature, Plant Classification Systems: Mechanic Systems, Natural Systems, Phylogenetic systems, Modern systems, Differentiation of the species, Spermatophyte (General Characteristics); General characteristics of Gymnospermae; Classification of Gymnospermae; Classification of Angiospermae: Magnoliopsida, Dicotyles, Liliopsida, Monocotyles.

BİY221 Plant Morphology 2+0 2.5

Inner Morphology: Plant cell, Plasma membrane, Pist and, Plastids, Ergastic matters, Plant tissue, Intercellular spaces; Classification of the Plant Tissues: Meristematic tissues, Classification of meristems according to their location and origins, Permanent tissue developed by cambium, Permanent tissues, Epidermis, Parenchyma and their classification, Supporting tissue (Sclerenchyma and Collenchyma), Vascular system, Secretion system, Inner Organography, Vegetative parts of plants, Generative parts of plants, Outer Organography; Structures of vegetative parts, Structures of generative parts.

BİY222 Seed Plants Laboratory 0+2 2.0

Seed Plants (Spermatophytes): Gymnospermae: Dissection and Investigation of Important Gymnospermae Groups: Pinaceae, Cupressaceae, Taxaceae; Angiospermae: General characteristics; Dicotyledons: General characteristics; Dissection and Investigation of Important Dicotyledons Groups: Magnoliidae (Ranunculaceae, Papaveraceae), Caryophyllidae (Caryophyllaceae), Dilleniidae (Malvaceae, Brassicaceae, Resedaceae), Rosidae (Rosaceae, Fabaceae, Euphorbiaceae, Linaceae, Geraniaceae, Apiaceae), Asteridae (Convolvulaceae, Boraginaceae, Lamiaceae, Scrophulariaceae, Asteraceae); Monocotyledons: Dissection and Investigation of Important Monocotyledon Groups: Commelinidae (Poaceae), Lilidae (Liliaceae, Iridaceae).

BİY223 Plant Morphology Laboratory 0+2 2.0

Investigation of Plant Cells Microscopically: Preparation, Cell membrane, Cell pits, Intercellular gaps, Plastids and their types, Ergastic substances; Investigation of Plant Tissues Microscopically: Meristematic tissues, Permanent Tissues (Protective tissue, Ground tissue, Collenchymas and sclerenchyma tissues, Vascular tissue, Secretory tissue); Investigation of Inner and Outer Structures of Plant Organs Macroscopically and Microscopically: Vegetative organs (stem, leaf and root), Generative organs (flower, fruit and seed); Investigation of Inflorescent types in Plants: Inflorescent types, Flower formula and Drawing flower diagram.

BİY224 Vertabrate Animals 2+0 2.5

Rules of Taxonomy; General Characters of Chordate; Origin of Chordate; Phylogeny of Chordates; The Subsystematics Groups of Chordates; Systematic of Primitive Chordates; Biology and Systematic of Cyclostomatous; Biology and Systematic of Chondrychthyes; Biology and Systematic of Osteichthyes; Biology and Systematic of Amphibians; Biology and Systematic of Reptilians; Biology and Systematic of Aves; Biology and Systematic of Mammalians.

BİY225 Cytology 2+0 2.0

The Evolution of the Cell: The evolution and the properties of the prokaryotic cells and the eukaryotic cells; Chemical Structure of the Cell: Inorganic and organic composition of the cell; Cell Membrane: Structure and function of cell membrane, Transport across the cell membranes, Connection types of cell-cell and cell-matrix; Organelles with Double Membranes in the Cell: Nucleus, Mitochondria, Chloroplast; Organelles with Single Membrane in the Cell: Endoplasmic reticulum, Golgi apparatus, Lysosomes, Peroxisomes; The organelles without membrane: Ribosome, Sentrosome; Structure and Functions of the Cytoskeleton.

BİY226 Vertabrate Animals Laboratory 0+2 2.0

Morphology of some Acrania species (Hemichordata, Urochordata, Cephalochordata), Morphology of some Agnatha (Cyclostomata) species, Morphology of some Chondrichthyes (Squaliformes, Rajiformes and Chimaeriformes) species, Morphology of some Osteichthyes species, Morphology of some Amphibians (Anura and Urodela) species, Morphology of some Reptilia species, Morphology of some Aves species, Morphology of some Mammalian species

BİY227 Cytology Laboratory 0+2 2.0

Cytological Techniques: Slide preparation, Staining, Microscopic examination methods; Living Organization: Experiment of quaservat formation; Examination of Cell Activity; Cell Counting Methods; Test of Cell Membrane Permeability; Examination of Cell Structures: Evaluation of different kinds of microscopes image; Examination of Cell Skeleton; Cell Division Mechanics; Relations of Cell and Surface: Relations of cell-cell and cell-matrix, Antigens of cell membrane.

BİY228 Arthropoda 2+0 2.5

The General Features of Arthropods; Classifications of Arthropods; Characteristics of Malacopoda (Onycophora, Tardigrata) and Euarthropoda (Crustacea, Chelicerata, Linguatulida, Pantapoda Myriapoda, Aptergota, Pterygota): Body

division, cuticle and chitin, external features, paired appendages, digestive, circulatory, respiratory, nervous reproductive systems, sense organs; Growth and Metamorphosis.

BİY229 Invertabrate Animals 2+0 2.5

Systematic and Taxonomy: History of systematic, Aim of taxonomy, Taxonomic system, The main characters of animals in classification, Naming of animals; Classification of invertebrate animals, Protista; Mastigophora, Sarcodina, Sporozoa, Ciliata; Animalia: Mesozoa, Parazoa, Coelenterata, Coelomata, Plathelminthes, Nemertini, Rotatoria, Nematoda, Kamptozoa, Mollusca, Annelida, Echiuroidea, Molluscoidea, Pogonophora, Echinodermata; The Phylogeny of Metazoans.

BİY230 Arthropods Laboratory 0+2 2.0

Collecting and preserving of Arthropods samples for scientific aim; Systematic and morphological examination of Crustacean (Entomostraca and Malacostraca) classis samples; Systematic and morphological examination of Chelicerata classis samples; Systematic and morphological examination of Linguatulida, Pentastomida) and Myriapoda classis samples; Systematic and morphological examination of Insects classis samples.

BİY231 Invertabrate Animals Laboratory 0+2 2.0

General Rules of Invertebrate Laboratory, Examination of single cell animals, which belonging to Protozoa subfilum. Observation of Spongia, Hydra, Jellyfish and Coral specimens, Evaluation of anatomical and morphological structure of Planaria, Trematods and Taenia, Nematoda and Acantocephala samples, Comparison of morphological and anatomical structure of Annelida specimens, Examination and determination of Mollusca, Cephalopoda and Molluscoidea specimens.

BİY232 General Ecology 2+0 3.0

Basic Concepts; Auto ecology and Population Ecology; Dynamics of Population; Ecology of Communities: Functional and structural features of communities, Ecosystems and Characteristics; Functional characteristics of ecosystems, Ecological cycles, Biological accumulation; Great Ecosystems in the World; Evolutional Ecology: Natural Selection, Genetic Variability, Life Strategies, Gene Banks; Applied Ecology: Ecological problems of humanity, Protection of the nature and biological variability, Economics of environment and planning, development.

BİY234 General Ecology Laboratory 0+2 2.0

Essential Rules in Ecological Studies: Essential rules in field and laboratory studies; Phenology and Biomass: Phenologic observations in plants and animals, biomass calculation; Decomposition; Climate: Climate components, Drawing of ombrothermic diagrams; Soil: Physical analysis of soil, chemical analysis of soil; Investigation of Water Ecosystem: Water acidity, determination of phosphate amount and hardness of water; Ecophysiology: Germination; Productivity: Determination of primer productivity, Chlorophyll identification method; Competition; Determination of Cellulose Amount; Structural Characteristics of Populations: Biodiversity, Determination of biodiversity.

BİY239 Molecular Biology 2+0 2.0

The Past, Present and Future of Molecular Biology; Mechanism of DNA Replication; Transcription in Prokaryotes: Operon systems; Transcription and Post-Transcriptional Regulation in Eukaryotes; Protein Synthesis and its Regulation; Post-Translational Modifications; Transport of Proteins to Membranes and Organelles; Molecular Motors; Immunoglobins and Their Molecular Mechanisms; Recombinant DNA Techniques; Methods for DNA Analysis; Methods for Protein Analysis.The Past, Present and Future of Molecular Biology; Mechanism of DNA Replication; Transcription in Prokaryotes: Operon systems; Transcription and Post-Transcriptional Regulation in Eukaryotes; Protein Synthesis and its Regulation; Post-Translational Modifications; Transport of Proteins to Membranes and Organelles; Molecular Motors; Immunoglobins and Their Molecular Mechanisms; Recombinant DNA Techniques; Methods for DNA Analysis; Methods for Protein Analysis.

BİY239 (Eng) Molecular Biology 2+0 2.0

The Past, Present and Future of Molecular Biology; Mechanism of DNA Replication; Transcription in Prokaryotes: Operon systems; Transcription and Post-Transcriptional Regulation in Eukaryotes; Protein Synthesis and its Regulation; Post-Translational Modifications; Transport of Proteins to Membranes and Organelles; Molecular Motors; Immunoglobins and Their Molecular Mechanisms; Recombinant DNA Techniques; Methods for DNA Analysis; Methods for Protein Analysis.The Past, Present and Future of Molecular Biology; Mechanism of DNA Replication; Transcription in Prokaryotes: Operon systems; Transcription and Post-Transcriptional Regulation in Eukaryotes; Protein Synthesis and its Regulation; Post-Translational Modifications; Transport of Proteins to Membranes and Organelles; Molecular Motors; Immunoglobins and Their Molecular Mechanisms; Recombinant DNA Techniques; Methods for DNA Analysis; Methods for Protein Analysis.

BİY241 Molecular Biology Laboratory 0+2 2.0

Introduction of Materials and Devices; Preparation of Buffer and Solution; DNA Isolation from Onion by Basic Technique; DNA Isolation Technique: Microorganisms, Cultured cells and insect; Analysis of DNA Purity and Amount Analysis by Spectrophotometer; DNA Analysis by Agarose Gel Electrophoresis; Analysis in Gel Photographs and Calculation of DNA

Fragment Sizes; Protein Isolation Technique: Plant and animal tissues; Spectrophotometric Analysis of Protein Concentration; Protein Standards Curve and Protein Concentration Calculations; Protein Analysis by Acrylamide Gel Electrophoresis; Analysis of Gel Photographs and Calculation of Protein Molecular Weights.Introduction of Materials and Devices; Preparation of Buffer and Solution; DNA Isolation from Onion by Basic Technique; DNA Isolation Technique: Microorganisms, Cultured cells and insect; Analysis of DNA Purity and Amount Analysis by Spectrophotometer; DNA Analysis by Agarose Gel Electrophoresis; Analysis in Gel Photographs and Calculation of DNA Fragment Sizes; Protein Isolation Technique: Plant and animal tissues; Spectrophotometric Analysis of Protein Concentration; Protein Standards Curve and Protein Concentration Calculations; Protein Analysis by Acrylamide Gel Electrophoresis; Analysis of Gel Photographs and Calculation of Protein Molecular Weights.

BİY241 (Eng) Molecular Biology Laboratory 0+2 2.0

Introduction of Materials and Devices; Preparation of Buffer and Solution; DNA Isolation from Onion by Basic Technique; DNA Isolation Technique: Microorganisms, Cultured cells and insect; Analysis of DNA Purity and Amount Analysis by Spectrophotometer; DNA Analysis by Agarose Gel Electrophoresis; Analysis in Gel Photographs and Calculation of DNA Fragment Sizes; Protein Isolation Technique: Plant and animal tissues; Spectrophotometric Analysis of Protein Concentration; Protein Standards Curve and Protein Concentration Calculations; Protein Analysis by Acrylamide Gel Electrophoresis; Analysis of Gel Photographs and Calculation of Protein Molecular Weights.Introduction of Materials and Devices; Preparation of Buffer and Solution; DNA Isolation from Onion by Basic Technique; DNA Isolation Technique: Microorganisms, Cultured cells and insect; Analysis of DNA Purity and Amount Analysis by Spectrophotometer; DNA Analysis by Agarose Gel Electrophoresis; Analysis in Gel Photographs and Calculation of DNA Fragment Sizes; Protein Isolation Technique: Plant and animal tissues; Spectrophotometric Analysis of Protein Concentration; Protein Standards Curve and Protein Concentration Calculations; Protein Analysis by Acrylamide Gel Electrophoresis; Analysis of Gel Photographs and Calculation of Protein Molecular Weights.

BİY305 Molecular Cell Physiology 2+0 2.5

Flow of Genetic Information in the Cell: Maintenance of genome, Translation of the genetic information; Cell Membrane Systems; Molecule Traffic in The Cells: Nucleus-cytoplasm traffic, ER and protein transport, Golgi and transport of molecules, Vesicular transport; Bioenergetics and Metabolism; Cell Signaling; Cell Cycle and Regulation; Cell Differentiation; Cell Death; Stem Cells; Cancer cells; Cell Culture Techniques.

BİY313 Ethology 2+0 4.0

Subdivisions of Ethology; Diversity of Behavior; Stimulus; Inherent Behaviors; Reflexes; Reluctant Motions; Instinctive Behaviors; Stimulation From Birth; Balancing and Finding Location; Changing Location; Learned Behavior; Habits; Conditioned Reflex; Trial and Error; Learning by Imitation; Memory and Learning Behavior; Social Behaviors: Mating behavior, Forming groups, Fights and dominance, Behavior of home ground, Insect societies; Research Methods for Behavior; Effects of Hormones on Behavior.

BİY316 Endocrinology 2+0 4.0

Definition and classification of hormones; Hormonal control; Effect Mechanisms of hormones and receptors; Synthesis and Secretion of hormones; Hypophise gland and its hormones: Vasopressin, Oxytosin, Somatotropin, Prolactin, Epiphysis; Hormonal control of calcium metabolism: Parathyroid gland and parathormone; Effects of hormones on different metabolisms; Thyroid gland and its hormones: Pancreas, Adrenal gland hormones: Mineralocorticoids, Glicororticoids, Adrenal sex hormones; Gastrointestinal hormone structure.

BİY317 Mycology 2+0 4.0

Morphology in Fungi; Fungal Cell, Thallus, Hypha, Special Somatic Structures, Hyphae Tissues; Fungal Growth; Asexual Reproduction, Para sexual Reproduction, Sexual Reproduction; Genetic; Differentiation of Fungi; The Nutrient Requirements of Fungi and Nutrition: Nutrient Capture; Nutrients for Fungi; Fungal Metabolism; Taxonomy of Fungi: Moulds with Simple Structure, Moulds with Complex Structure; Fungi as Plant Parasites; Fungal Parasites of Humans, Insects and Nematodes; Beneficial Activities of Fungi.

BİY318 Insect Ecology 2+0 4.0

The Study Principles of Insect Ecology; Habitats of Insects; Abiotic Factors in the Environment and Effects on Insects: Climate and temperature, pressure, soil, light, water and dump, ph; Biotic Factors in the Environment and the Effects on Insects; Food and Feeding Features of Insects: Feeding habits, phytophagous, saprophagus, carnivorous; Intraspecific and Interspecific Competition; Symbiosis; Prasitism; Commensalism; The Effects of Plant Environment on Insects; Population Dynamics and Growth.

BİY319 Enzymology 2+0 4.0

General properties: Enzyme-substrate relation; Vitamins; Differences between enzymes and normal catalytic substances; Chemical structure of enzymes; Cofactor and coenzymes: Important coenzymes and the groups they transfer; Enzyme activity: Activity of catalytic center; Factors that affect enzyme activity; Enzyme kinetics: Michealis-menten, Line-Weaver-

burk plots; Conformation changes of enzyme; Enzyme specifity; Allosteric enzyme; Activators and Inhibitors: Competitive inhibition, Non-competitive inhibition; Enzyme classification.

BİY326 Biodiversity and Flora of Turkey 2+0 4.0

What is Biodiversity?: Ecosystem diversity, Species diversity, Genetic diversity; Process Diversity; Loss of Biodiversity; Importance and Conservation of Biodiversity; Conservation: In-situ and ex-situ conservation methods; Biodiversity in Turkey: Causes of the richness of the flora of Turkey; Floristic regions in Turkey, Characteristic - plant species which spread over these regions; Effect of land and soil use on the flora in Turkey; Conservation areas in Turkey and current situation.

BİY328 Paleontology 2+0 4.0

What is Palynology? What is Pollen? Pollen Structure; Pollen Morphology; The Structures of Pollens; Pollen Types; Palinology Practices; Preparation Techniques in Palynology; Materials and Methods Using in Palinologic Studies; Pollen Calendar; Allergenic Pollens.

BİY329 Environmental Impact Assessment 2+0 4.0

What is Environmental Impact Assessment (EIA)? Environment Law: Aim and concept, Necessity of EIA.; Regulations of Environmental Impact Assessment (EIA); Preservation Areas in Turkey and the Species Under Risk Categories; Groups to be Considered in Environmental Impact Assessment (EIA); Origin of the Flora of Turkey; General Overview of Flora in Turkey; Floristically Analyses in Environmental Impact Assessment (EIA) Studies; Fauna in Turkey; General Overview of Fauna in Turkey; Faunistic Analyses in Environmental Impact Assessment (EIA) Studies; Pollution and Pollutants; Preparing the ÇED Report and Presentation.

BİY330 Techniques in Systematic Botany 2+0 4.0

Classical Methods Used in Plant Classification: Sampling and Storage Methods; What is character?: Characters used in classical and modern classification; Introduction to Chemotaxonomy; Introduction to Cytotaxonamy; Molecular Techniques used in Plant Classification: Sampling and storage methods; DNA fingerprinting techniques, PCR, isozymes and allozymes; Cytogenesis; Revision Studies in Plant Classification

BİY334 Biological Control 2+0 4.0

The Principles of Pest Control: Natural balance, Threshold of the economic damage, Serviceable scale of finance, Projected estimates and warnings; Methods of Biological Control Against to Pests: Cultural measures, Mechanical control, Physical control, Chemical control, Quarantine measures; Biotechnical methods; Biological Control: Advantages of biological control, Features of natural predators, Efficiency of predators, Methods for biological control, Animal groups used against pests, Microbial control, Toxins of microorganism.

BİY336 Ornithology 2+0 4.0

Origins; Diversity of birds; History; Systematic; Form and Function: Feathers, Flight, Physiology, Feeding; Behavior and Communication: Brains and senses, Visual communication, Vocal communication; Behavior and Environment: The annual cycles of birds, Migration, Social behavior; Reproduction and Development: Reproduction, Nests and incubation, Mates, Growth and development, Parental care; Population Dynamics and Conservation; Demography, Population, Species, Communities, Conservation of Endangered species.

BİY339 Physiology of Animals 2+0 2.5

Nervous System: Nervous system in invertebrate animals, Nervous system in vertebrate animals, Transmission to nerve, Peripheral nervous system, Central nervous system;. Physiology of Movement: Amoeboid movement, Movement by cilia, Flagella, Muscle; Physiology of Feeding and Digestion; Physiology of Respiration: Respiration by level of body, Gill, Trachea, Lung, Respiration in vertebrate animals; Physiology of Circulation: Animals without circulation system, Open and closed circulation, Circulation in invertebrate, Circulation in vertebrate, Temperature regulation; Excretion: Excretion by level of body, Protonefridiums and nefridiums, Structure of kidney and roles of nefrons; Physiology of Sense.

BİY341 Physiology Laboratory of Animals 0+2 2.0

Anesthesia of Frog; Compound Action Potential and Nerve Conduction in Frog Sciatic Nerve; Physiology of Skeletal Muscle in the Frog Gastrocnemius Muscle; Cardiac Muscle Activities in the Frog heart; Electromyography; Physiology of Digestion: Factors affecting enzyme activities, Digestion of lipits; Cardiovascular Physiology: Electrocardiogram, Pulse, Blood pressure, Heart sounds; Respiratory Physiology: Lung volumes, Lung capacities, Pulmonary flow rates; The examination of Excretory Physiology in Nephridium and Mammal kidney.

BİY343 Hydrobiology 2+0 4.0

Scope of Hydrobiology; Hydrological Cycle; Physical and Chemical Characteristics of Waters; Aquatic Ecosystems: Lentic freshwaters (lakes, ponds, temporary waters), Lotic freshwaters (rivers, streams); Inland Salt Water and Brackish Ecosystems; Marine Ecosystems; Wetland Ecosystems; Biological Productivity and Food Change of the Aquatic Environments; Pollution and Saprobic System in the Waters; Upwelling and Red-tide in the Sea; Eutrophication.

BİY352 Introduction to Lichenology 2+0 4.0

Introduction; History of Lichenology; Symbiosis and Lichens; Photobionts and Mycobionts in Lichen thallus; Thallus morphology and anatomy: Cortex, Algal layer, Medulla; Lichen physiology: Photosynthesis, Respiration, Growth, Accumulation of water and mineral; Lichen biochemistry and seconder metabolites: Production and role of them in the Lichen thallus; Economical use of Lichens; Classification of Lichens; Lichenicolous lichen and lichenicolous fungi; Monitoring techniques in Lichen for pollution: In situ and the uses methods by transplanted materials.

BİY354 Plant Physiology 2+0 2.5

Plant and Cell Architecture; Energy, Enzymes and Gene Expression; Water and Plant Cells; Mineral Nutrition; Solute Transport; Photosynthesis: The light reaction; Carbon Metabolism; Physiology and Ecological Considerations; Respiration and Lipid Metabolism; Assimilation of Mineral Nutrients; Surface Protection and Secondary Compounds; Stress Physiology; The Cellular Basis of Growth and Morphogenesis Genesis; The Control of Flowering.Plant and Cell Architecture; Energy, Enzymes and Gene Expression; Water and Plant Cells; Mineral Nutrition; Solute Transport; Photosynthesis: The light reaction; Carbon Metabolism; Physiology and Ecological Considerations; Respiration and Lipid Metabolism; Assimilation of Mineral Nutrients; Surface Protection and Secondary Compounds; Stress Physiology; The Cellular Basis of Growth and Morphogenesis Genesis; The Control of Flowering.

BİY354 (Eng) Plant Physiology 2+0 2.5

Plant and Cell Architecture; Energy, Enzymes and Gene Expression; Water and Plant Cells; Mineral Nutrition; Solute Transport; Photosynthesis: The light reaction; Carbon Metabolism; Physiology and Ecological Considerations; Respiration and Lipid Metabolism; Assimilation of Mineral Nutrients; Surface Protection and Secondary Compounds; Stress Physiology; The Cellular Basis of Growth and Morphogenesis Genesis; The Control of Flowering.Plant and Cell Architecture; Energy, Enzymes and Gene Expression; Water and Plant Cells; Mineral Nutrition; Solute Transport; Photosynthesis: The light reaction; Carbon Metabolism; Physiology and Ecological Considerations; Respiration and Lipid Metabolism; Assimilation of Mineral Nutrients; Surface Protection and Secondary Compounds; Stress Physiology; The Cellular Basis of Growth and Morphogenesis Genesis; The Control of Flowering.

BİY356 Plant Physiology Laboratory 0+2 2.0

Plant Analyses: Water Quantification, Quantification of Inorganic and Organic Substances; Solute Transport in Plants: Diffusion, Osmosis, Dialyses; Plant and Water: Transpiration; Photosynthesis: Chlorophyll Extraction, Separation of Dyed Substances by Paper Chromatography, Optics and Spectrum of Chlorophyll; Respiration: Anaerobic and Aerobic Respiration, Respiration Co-efficient, Growth and Developmental Physiology: Measurement of Micro- and Macroscopic Growth, Root Growth; Plant Movements: Phototropism, Effects of Light on Phototropism, Response of a Seedling to Fototropism, Geotropism; Hormones; Plant Stress Physiology: Mineral Stress with Water Culture.Plant Analyses: Water Quantification, Quantification of Inorganic and Organic Substances; Solute Transport in Plants: Diffusion, Osmosis, Dialyses; Plant and Water: Transpiration; Photosynthesis: Chlorophyll Extraction, Separation of Dyed Substances by Paper Chromatography, Optics and Spectrum of Chlorophyll; Respiration: Anaerobic and Aerobic Respiration, Respiration Co-efficient, Growth and Developmental Physiology: Measurement of Micro- and Macroscopic Growth, Root Growth; Plant Movements: Phototropism, Effects of Light on Phototropism, Response of a Seedling to Fototropism, Geotropism; Hormones; Plant Stress Physiology: Mineral Stress with Water Culture.

BİY356 (Eng) Plant Physiology Laboratory 0+2 2.0

Plant Analyses: Water Quantification, Quantification of Inorganic and Organic Substances; Solute Transport in Plants: Diffusion, Osmosis, Dialyses; Plant and Water: Transpiration; Photosynthesis: Chlorophyll Extraction, Separation of Dyed Substances by Paper Chromatography, Optics and Spectrum of Chlorophyll; Respiration: Anaerobic and Aerobic Respiration, Respiration Co-efficient, Growth and Developmental Physiology: Measurement of Micro- and Macroscopic Growth, Root Growth; Plant Movements: Phototropism, Effects of Light on Phototropism, Response of a Seedling to Fototropism, Geotropism; Hormones; Plant Stress Physiology: Mineral Stress with Water Culture.Plant Analyses: Water Quantification, Quantification of Inorganic and Organic Substances; Solute Transport in Plants: Diffusion, Osmosis, Dialyses; Plant and Water: Transpiration; Photosynthesis: Chlorophyll Extraction, Separation of Dyed Substances by Paper Chromatography, Optics and Spectrum of Chlorophyll; Respiration: Anaerobic and Aerobic Respiration, Respiration Co-efficient, Growth and Developmental Physiology: Measurement of Micro- and Macroscopic Growth, Root Growth; Plant Movements: Phototropism, Effects of Light on Phototropism, Response of a Seedling to Fototropism, Geotropism; Hormones; Plant Stress Physiology: Mineral Stress with Water Culture.

BİY358 Genetics 2+0 2.5

Genetics and Concept of Gene; Phenotype and Genotype of Biosphere; Genetics and Food Production; Genetics and Health; Genetic Politics and Laws; Genetic Engineering; History; Cytological Foundations of Genetics: Cell division, Life cycles of sexual reproductive organisms; Relation Between Genotype and Phenotype: Genes interaction, Mendelism, Alleles interaction, Catallelism, Sex determination and sex dependent inheritance; Cytoplasm Ieritance; Connection and Recombination; Calculating of Recombination Frequency; Chromosome Maps; Mutations: Genome, Chromosome, Gene mutations.

BİY360 Genetic Laboratory 0+2 2.0

Preparation of Karyotype Analysis: Karyotype analysis of plant root tips; Examination of Human Chromosomes: Examination of human chromosomes morphology and aberrations from slide; Examination of Human Sister Chromatic Exchanges; Chromosome Banding Techniques; Examination of Micronucleus Formation; Slide Preparation to X-Chromatin Analysis; Monohybrid Crosses on Drosophila: Eliminations of parents and crosses, Examination of F1 and F2 generations and counts of F2, Chi-square analysis, Evaluation and discussion of experiments data.

BİY367 Microorganisms and Energy 2+0 4.0

Microbial Metabolism and Diversity; Energy Release and Conservation; Microorganisms as Alternate Energy Sources; Methanogenic Bacteria in Obtaining Energy; Photosynthetic Bacteria in Obtaining Energy; Biomass a Source of Renewable Energy; Microorganisms in Ethanol, Biodiesel, Hydrogene Production; Microbial Fuel Cells; Biotechnology for Developing Novel Microorganisms.

BİY369 Medical Plants 2+0 4.0

Plant Nomenclature; Principles of Plant Taxonomy; Identification of Medical Plants; Breeding Methods of Medical Plants, Collecting, Drying and Storing of Medical Plants From Nature; Ingredients of Medical Plants; Effect and Usage Methods of Medical Plants; Plants Which are Used as Paints, Spice and Magic; Natural Plants Which are Consumed For Food and Their Ways of Consumed; Poisonous Plants of Turkey; Widely Used Medical Plants in Turkey; Critical Points of Using Medical Plants; The History of Medical Plants in Turkey.

BİY371 Biotechnology 2+0 2.5

What is Biotechnology?: History and Scope of Biotechnology, Applications of Biotechnology, Microbial Metabolites and Biotechnological Importance, Microbial Secondary Metabolites and Their Applications in Biotechnology; Ezyme Technology: Enzyme Production Methods, Industrial Enzyme Production by Recombinant DNA Technologies, Enzyme Isolation, Purification and Characterization, Enzyme Immobilization and Methods; Recombinant DNA and Gene Cloning Steps: DNA Sources Used in Gene Cloning, Genetically Modified Organisms; Usage of Biotechnology in Diagnosis and Therapy of Genetical Diseases; Cell Culture; Stem Cells; Tissue Engineering.

BİY373 Biotechnology Laboratory 0+2 2.0

Biotechnology Application Areas; Investigation of Microbial Secondary Metabolites by TLC; Investigation of Microorganisms Antibiotic Production Capability; Investigation of Microorganisms Enzyme Production Capability; Extraction of Intracellular Enzymes and Different Cells Digestion Methods; Enzyme Purification Methods; Determination of Enzyme Activity; Genomic DNA Isolation; Plasmid DNA Isolation; Restriction Digest of Plasmid DNA and Gel Electrophoresis, Bacterial Transformation; Cell Culture Applications.

BİY374 Immunology 2+0 4.0

Introduction to Immunology; Innate Immunity; Cells of the Immun System; Antigen Capture and Presentation to Lymphocytes; Antigen Recognition in the Immun System; Antibodies; Overview of Antibacterial Defences; Cell-Mediated Immune Responses; Humoral Immun Responses; Effector Mechanisms of Humoral Immunity; Immunological Tolerance and Autoimmunity; Immunological Memory; Immun Defences Against Viruses; Immunosuppression; Hypersensitivity; Congenital and Acquired Immunodeficiencies.

BİY375 Forensic Biology 2+0 4.0

What is Forensic Biology; Forensic Biology and Medicine Procedures; Forensic Biology Examination; Biological Occupation and Strength Loss; Human Rights Violations; Errors in Biological and Medical Applications; Substance Use: Alcohol and substance use; Death: Asphyxia (Oxygen deficiency), Various injuries, Accidents; Biological Examination on the Spot: Toxicological examinations, Microscopic examinations; Blood and Body Fluids; Fingerprints; Mass Death; Intoxications, Forensic Biology Problems Related with Pregnancy and Birth; Biological Proofs; DNA analysis; Medical Ethics.

BİY376 Virology 2+0 4.0

History of virology; Introduction to The Viruses; The Virus Morphology and Their Chemical Structure; Replication Strategies of The Viruses; Classification and Characterization of The Viruses; Bacteriophages; Plant Viruses; Animal Viruses; Viruses with Reverse Transcriptases; Viroids; Prions; Methods for the Isolation of Viruses from Environmental Samples; Determination of Virus Abundance by Epifluorescence Microscopy; Basic Phage Electron Microscopy.

BİY377 Foodborne Pathogenic Microorganisms 0+3 5.0

Classification of Food Borne Pathogenic Microorganisms and Parasites; Food Borne Pathogenic Bacteria (E. Coli O157:H7, Salmonella spp., Thermopile Camplobacter, V. paraheamolyticus, S. aureus, B. cereus, L. Monocytogenes); Foodborne Fungi: Adverse effects on health, Mycotoxin formation mechanism and the factors influencing mycotoxin formation; Food

Borne Virus; Food and Water-borne Parasites: Algal toxins; Pathogenic Microorganisms in the Advanced Analysis Techniques Rapid and Automated Methods.

BİY378 Statistical Applications in Biology 2+0 4.0

General Concepts; Sampling: Sampling theory, Distribution theory, determination of confidence scale of sampling mean for large and small samples, data collection and data classification, Determination and Applications of Distributions: Hypothesis tests, Chi-Square test, z and t distributions, Correlation and Regression Analysis, Statistical Package Programs; Decision Making; Evaluation of analysis results and its application in biological studies.

BİY379 Histology 0+3 5.0

Techniques of Microscopy; Animals Tissue and Structures; Classification of Cells; Epithelial Tissue and Classification: Epithelium, Glands; Connective Tissue: Classification of connective tissue, Connective tissue cells; Blood and Blood Cells: Erythrocyte, Leukocyte, Thrombocyte, Lymph; Cartilage Tissue and Classification: Hyaline cartilage, Elastic cartilage, Fibro cartilage; Bone Tissue and Bone Formation; Muscular Tissue and Classification: Smooth muscle, Skeletal muscle, Cardiac muscle; Nervous Tissue: Cells of nerve tissue.

BİY383 Microbial Techniques 0+3 5.0

Introduction; Cultural Methods for Counting Microorganisms; Microscopicall Methods for Counting Microorganisms; Standardized Methods for Counting Microorganisms; Metabolic Methods for Counting Microorganisms; Other Methods for Counting Microorganisms; Biochemical Tests; Media And Sterilization; Indicator Microorganisms; Sampling Methods: Hydrophobic grid membrane filtration technique, Direct epifluorescence microscopy technique, Electrical impedance technique, Bioluminescence technique.

BİY384 Plant Ecology 2+0 4.0

Fundamental Concepts; Adaptation in Environment and Plant; Effects of Abiotic and Biotic Factors on Plants: Plant environment relationship, Ecological life span of plants; Power of Life; Ecological Adaptation and Evolution: Ecophene, Ecotype, Ecospecies, Ecological importance of variations between species; Spreading Plants and Migration; Importance of Plants for the Ecosystem; General Characteristics of Plant Society; Plant Formations; Characteristics of Plant Formations; Succession and Climax; Protection of Ecology: Protection of plant gene sources, Effects of pollution on plants; Ecological Conditions of Plants in Turkey; Field and Laboratory Methods for Plant Ecology.

BİY385 Comparative Anatomy and Morphology of Animals 2+0 4.0

Classification of Vertebrate Animals; Comparisons of Skin and Skin Derivatives: Examination of vertebrate skin preparations, Comparisons of Skeleton System; Comparisons of Muscle System; Comparisons of Digestion System: Dissection of Aves and mammalian digestive systems; Comparison of Coolum and Mesenteries; Comparison of Circulation Systems; Comparative Examination of Pisces Amphibian and Mammalian Circulation Systems; Comparison of Respiratory Systems; Comparison of Excretion Systems; Comparison of Reproductive Systems; Comparison of Nervous Systems: Comparative Examination of Pisces, Amphibian and Mammalian Brains; Comparison of Sense Systems.

BİY386 Microbial Ecology 2+0 4.0

Air Microbiology; Soil Microbiology; Water Microbiology: Fresh water environment, Saline water environment, Deep water microbiology, Drinking water microbiology; Extreme Environments: High temperature environments, Extreme acidic and alkaline environments, High saline environments; Biochemical Cycles: Carbon, Nitrogen, Sulfur, Phosphor, Hydrogen, Oxygen, Manganese; Plant Microorganism Interactions: Root nodule bacteria; Rumen Bacteria.

BİY388 Molecular Biology Techniques 2+0 4.0

General Aspect to the Molecular Biological Methods; DNA Isolation and Purification; DNA Analyzes: Spectral methods, Electrophoresis methods, Agarose gel electrophoresis, Pulse-field gel electrophoresis; Transformation of Bacteria; DNA Replication via PCR; Nucleic Acid Hybridization Methods: Western blot, Southern blot assay; Protein Isolation and Purification: Protein extraction, SDS-Page electrophoresis; Enzymatic Analyses and Methods for Enzyme Activity.

BİY390 Wastewater Microbiology 2+0 4.0

Water Circulation and Autopuration; Drinking Water and Tap Water: Treatment of drinking and tap water, Disease infected by water, Microorganisms that effect water quality; Water Pollution and Its Importance; Properties of Wastewater; Biosensors; Important Microorganisms Group in Treatment; Biological Water Treatment Systems: Active sludge, Biofilms, Biodisks; Removal of Sludge from Treatment Systems; Biotechnological Approaches to Wastewater Treatment.

BİY391 Cell Signaling Mechanisms 2+0 4.0

Introduction to Intracellular Signal Transduction: Signal transduction with G-protein mediated receptors, Signal transduction with enzyme-linked cell surface receptors, Ion channel receptors; Intracellular Signal Transduction Pathways: cAMP, Secondary messengers, Phospholipids, Ca+2 and Calmodulin; Multiple Signaling Pathways: MAP-Kinase pathway; Signal Transduction With Nuclear Receptors; Cell Cycle Check Points: Cyclins and cyclin dependent kinases; Cell Death

Pathways; Signal Pathways in Development and Differentiation: Notch, Hedgehog and WNT-Beta cathenin signaling pathways; Signal Pathways in the Formation of the Cell Skeleton.

BİY392 Human Gene Therapeutics and Recombinant Production 2+0 4.0

Human Diseases: Genetics and physiological basis, Diagnosis, Treatments; Gene Treatment of Stem and somatic cell: Gene addition, Gene replacement, Down regulation of gene expression and Selective killing of target cells; Production of recombinant gene drugs in cell factory: E.coli, S. cerevisiae, Mammalian or human cell lines, insect cell line, Pichia pastories; Gene Transfer Tools: Viral vectors; Liposomes, Electroporation, Direct injection, Particle bombardment; Examples for Recombinant Gene Drug Production: Insulin, Erythropoietin, İnterferon, Factor VIII; Examples for Gene Treatment: Adenosine deaminase enzyme gene, Severe combined immune deficiency.

BİY394 Entrepreneurship in Biology:Design and Development 2+0 4.0

Entrepreneurship: Definition; Charateristics of a Successful Entrepreneur; Self-analysis of entrepreneurs; Types of Ownership: Small firms and types of small firms, Factors effecting the success of small businesses; Biological Entrepreneurship and National Economy; Iinnovative Steps toward a Biological Product: Innovative planning, Prototypes; Large Production and Strategies in Marketing; Definition of Patent; Introduction to the Patent Laws and Examples of Patents in Biological Sciences; Practising Entrepreneurship in Biology Education by Developing a Project for a Marketable Biological Product.

BİY395 Biochemistry I 2+0 2.5

Biochemistry: Setting the Stage; Amino Acids, Peptides and Proteins; Protein Architecture; Biological Functions of Proteins: Hemoglobin; Protein Purification; Enzyme I: Reactions, Kinetics and inhibition; Enzyme II: Coenzymes, Regulation, Abyzymes and ribozymes; Carbohydrates: Structure and biological functions; Lipids, Biological membranes and cellular transport.Biochemistry: Setting the Stage; Amino Acids, Peptides and Proteins; Protein Architecture; Biological Functions of Proteins: Hemoglobin; Protein Purification; Enzyme I: Reactions, Kinetics and inhibition; Enzyme II: Coenzymes, Regulation, Abyzymes and ribozymes; Carbohydrates: Structure and biological functions; Lipids, Biological membranes and cellular transport.

BİY395 (Eng) Biochemistry I 2+0 2.5

Biochemistry: Setting the Stage; Amino Acids, Peptides and Proteins; Protein Architecture; Biological Functions of Proteins: Hemoglobin; Protein Purification; Enzyme I: Reactions, Kinetics and inhibition; Enzyme II: Coenzymes, Regulation, Abyzymes and ribozymes; Carbohydrates: Structure and biological functions; Lipids, Biological membranes and cellular transport.Biochemistry: Setting the Stage; Amino Acids, Peptides and Proteins; Protein Architecture; Biological Functions of Proteins: Hemoglobin; Protein Purification; Enzyme I: Reactions, Kinetics and inhibition; Enzyme II: Coenzymes, Regulation, Abyzymes and ribozymes; Carbohydrates: Structure and biological functions; Lipids, Biological membranes and cellular transport.

BİY396 Biochemistry II 2+0 2.5

Basic Concepts of Cellular Metabolism and Bioenergetics; Metabolism of CH; Production of NADH and NADPH: The citric acid cycle, The glyoxylate cycle and the phosphogluconate pathway; ATP Formation by Electron-Transport Chains; Metabolism of Fatty Acids and Lipids; Metabolism of Amino Acids and Other Nitrogenous Compounds; Integration, Coordination and Specialization in Metabolism.Basic Concepts of Cellular Metabolism and Bioenergetics; Metabolism of CH; Production of NADH and NADPH: The citric acid cycle, The glyoxylate cycle and the phosphogluconate pathway; ATP Formation by Electron-Transport Chains; Metabolism of Fatty Acids and Lipids; Metabolism of Amino Acids and Other Nitrogenous Compounds; Integration, Coordination and Specialization in Metabolism.

BİY396 (Eng) Biochemistry II 2+0 2.5

Basic Concepts of Cellular Metabolism and Bioenergetics; Metabolism of CH; Production of NADH and NADPH: The citric acid cycle, The glyoxylate cycle and the phosphogluconate pathway; ATP Formation by Electron-Transport Chains; Metabolism of Fatty Acids and Lipids; Metabolism of Amino Acids and Other Nitrogenous Compounds; Integration, Coordination and Specialization in Metabolism.Basic Concepts of Cellular Metabolism and Bioenergetics; Metabolism of CH; Production of NADH and NADPH: The citric acid cycle, The glyoxylate cycle and the phosphogluconate pathway; ATP Formation by Electron-Transport Chains; Metabolism of Fatty Acids and Lipids; Metabolism of Amino Acids and Other Nitrogenous Compounds; Integration, Coordination and Specialization in Metabolism.

BİY397 Biochemistry Laboratory I 0+2 2.0

Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; A Review of Different Concentration Concepts; Acid-Base and Buffer Solutions; Purity Control of Distilled Water; Colorimeter-Spectrometer (Identification and Principles); Denaturation and Deproteinisation; Qualitative Protein Assays; Quantitative Protein Assays; Qualitative Lipid Assays; Qualitative Carbohydrate Assays; General Evaluation.Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; A Review of Different Concentration Concepts; Acid-Base and Buffer Solutions; Purity Control of Distilled Water; Colorimeter-Spectrometer (Identification and Principles); Denaturation and Deproteinisation; Qualitative

Protein Assays; Quantitative Protein Assays; Qualitative Lipid Assays; Qualitative Carbohydrate Assays; General Evaluation.

BİY397 (Eng) Biochemistry Laboratory I 0+2 2.0

Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; A Review of Different Concentration Concepts; Acid-Base and Buffer Solutions; Purity Control of Distilled Water; Colorimeter-Spectrometer (Identification and Principles); Denaturation and Deproteinisation; Qualitative Protein Assays; Quantitative Protein Assays; Qualitative Lipid Assays; Qualitative Carbohydrate Assays; General Evaluation.Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; A Review of Different Concentration Concepts; Acid-Base and Buffer Solutions; Purity Control of Distilled Water; Colorimeter-Spectrometer (Identification and Principles); Denaturation and Deproteinisation; Qualitative Protein Assays; Quantitative Protein Assays; Qualitative Lipid Assays; Qualitative Carbohydrate Assays; General Evaluation.

BİY398 Biochemistry Laboratory II 0+2 2.0

Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; Qualitative Amylase Determination; Liver and Kidney Function Tests; Qualitative Total Cholesterol Determination; Qualitative Creatinin Determination; Qualitative Biluribin Determination; Qualitative Urine Analysis; Microscopic Analysis of Urine; Determination of Nitrite in Various Water Samples; Phosphate and Calcium Determination in Foods; Enzyme Activity Measurements (Catalase Assay); General Evaluation.Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; Qualitative Amylase Determination; Liver and Kidney Function Tests; Qualitative Total Cholesterol Determination; Qualitative Creatinin Determination; Qualitative Biluribin Determination; Qualitative Urine Analysis; Microscopic Analysis of Urine; Determination of Nitrite in Various Water Samples; Phosphate and Calcium Determination in Foods; Enzyme Activity Measurements (Catalase Assay); General Evaluation.

BİY398 (Eng) Biochemistry Laboratory II 0+2 2.0

Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; Qualitative Amylase Determination; Liver and Kidney Function Tests; Qualitative Total Cholesterol Determination; Qualitative Creatinin Determination; Qualitative Biluribin Determination; Qualitative Urine Analysis; Microscopic Analysis of Urine; Determination of Nitrite in Various Water Samples; Phosphate and Calcium Determination in Foods; Enzyme Activity Measurements (Catalase Assay); General Evaluation.Laboratory Rules; Introduction to Biochemistry Laboratory and Equipments; Qualitative Amylase Determination; Liver and Kidney Function Tests; Qualitative Total Cholesterol Determination; Qualitative Creatinin Determination; Qualitative Biluribin Determination; Qualitative Urine Analysis; Microscopic Analysis of Urine; Determination of Nitrite in Various Water Samples; Phosphate and Calcium Determination in Foods; Enzyme Activity Measurements (Catalase Assay); General Evaluation.

BİY401 Plant Mineral Nutrition 2+0 4.0

The plant root system and interaction with soil; Soil and minerals; Essential elements; Techniques for growing plants in nutritional studies; Solution transport; Auxins; Gibberellins; Cytokinins; Ethylene and Abscisic acid.

BİY402 The Evolution 2+0 3.0

Progress of Evolution Concept; Progress of Scientific Idea About Evolution; Living Communities; Evidence for Evolution; Crude Materials of Evolution: Variations and modifications; Factors of Evolution: Mutations, Selections, Sexual selections and adaptation for reproduction, Isolation mechanisms, Genetic drift, Migrations; Theories of Evolution: Lamarckism, Darwinism, Mutationism, Neodarwinism; Preadaptation; Origin of New Species; Evolution of Homo sapiens.

BİY404 Human Biology 2+0 3.0

Place of human in universe; Skin and functions: Skin structure and derivatives, Functions of skin; Skeleton system: Structure and functions of skeleton system; Muscles and movement: Muscle structure and organization; Nourishment; Digestion and digestion system: Organs in digestion system; Circulation system: Movement of blood, Structure of heart and vessels; Structure and functions of blood; Respiratory system; Excretion system; Reproduction system; Neural system; Endochrin system; Structure of hormones; Sense organs

BİY405 Developmental Biology I 2+0 3.0

Ontogenesis and Embryology; Development in a Cell; Development and Living Phase; Acts of Development; Main Phases of Development: Gametogenesis, Fertilization, Segmentation, Gastrulation, Development of mesoderm and coelom; The Differentiation: The determination of development, Induction and organization zones; The organization by gradient system, Morph genesis, Histogenesis, Organ genesis; The Effects of External Factors on Development; Metamorphosis; Regeneration; Death; Development of Invertebrate Animal Groups.

BİY406 Developmental Biology II 2+0 3.0

Reproduction of Plants: Types of Reproduction, Life cycles; Reproduction of Algae; Life Cycles and Development: Chlorophyta, Chrysophyta, Phaeophyta, Rhodophyta; Life Cycles and Development in Mosses: Anthoceratae, Hepaticae

and Musci; Life Cycles and Development in Ferns: Life Cycles in the Isosporic and Heterosporic Ferns; Reproduction and Development in Gymnospermae: Cone structure, ontogeny of polen and ovul; Reproduction and Development in Phanerogams; Microsporogenesis, Megasporogenesis, Fertilization, Formation of zygot and embriyo, Polyembriony, Apomyxis; Dormancy and Seed Germination; Organogenesis in Plants.

BİY408 Embryology 2+0 4.0

Description of Embryology; Reproduction: Asexual reproduction, Sexual reproduction; Male Reproduction System and Classification: Sperm, Spermatogenesis, Spermiohistogenesis; Female Reproduction System and Classification: Structure of Ovum, Oogenesis; Fertilization; Formation of Embryo: Cleavage, Blastulation, Gastrulation; Formation of Germ Layer: Development of ectodermal sheet, Development of Mesodermal sheet, Development of endodermal sheet; Organogenesis.

BİY409 Human Genetics 2+0 4.0

History; Composition of DNA in a human cell; Classification of DNA; Packaging of DNA; Structure and Types of Chromosome; Methods of Chromosome Painting; International System for Nomenclature of Human Chromosomes; Chromosome Abnormalities and Nomenclature of Chromosome Abnormalities; Analysis and Principles of Genetic Diseases; Importance of Genetic Maps and Methods for Genetic Maps; Chromosome Obtaining Methods in Clinic; Various Genetic Diseases and their Inheritance; Mitochondrial DNA; Maternal Inheritance and Related Diseases; Cancer; Carcinogen and Mutagenes.

BİY410 Medical Microbiology 2+0 4.0

History of Epidemiology; Epidemiological Terminology; Disease Reservoirs; Infectious Disease Transmission; Hospital Infections; Airborne Transmission of Pathogens; Respiratory Infections: Bacterial; Respiratory Infections: Viral; Sexually Transmitted Diseases: AIDS, Hepatitis C; Animal-Transmitted Diseases; Foodborne Diseases; Waterborne Diseases; Public Health and Water Quality; Public Health and Its Importance; Infectious Disease and Its Importance; Pathogenic Fungi; Clinical Immunology.

BİY412 Plant Geography 2+0 3.0

Physiological Reactions and Adaptations: Floristic Plant Geography; Areas and Its Geopraphical Distributions: Uninterrupted continental areas, Interrupted continental areas, Relict areas, Vicarious areas, Endemism and endemic areas; Spreading and Migration of Plants; Main Flora Regions of the World; Formations and Categories of Plants; Aquatic Habitats; Terrestrial Plant Association; Ecological Conditions for Plant Formations in Turkey; Flora and Biogeographical Regions of Turkey; Relationships Between Natural Plant Society and Land Use in Turkey.

BİY413 Soil-Plant Relation 2+0 4.0

Environment and its elements; Soil and biotic factors; Soil composition, Main materials of the soil and types of rocks, Types of cutting to pieces, Classification of main matter; Soil structure: Soil organic material and importance for plants, organic factors which affect soil formation; Micro flora, Macro flora, Micro fauna, Mesofauna, Inorganic materials and nutrients in soil; Soil indicator plants; Soil-water and plant relationships: Soil reaction and plant relation, Soil profile and plant relation, factors which affect soil development, Major soil groups and vegetation types.

BİY414 Zoogeography 2+0 3.0

Theories on Historical Geopraphy of the World; Geological Time and Glacial Periods; Principles of Animal Distribution; Zoogeographic Regions of the World and Geographical Distributions of Animals; Biological Diversity in Turkey; Turkey's Importance in the World of Living Things; Explanation of Zoogeography in Turkey; Zoogeographic Distribution of Freshwater and Terrestrial Animals in Turkey; Zoogeographic Features of the Black Sea and the Mediterrenian.

BİY415 Fish Biology 2+0 4.0

Classificaton of the Fish; Characteristics of Classes (Cyclostomata, Chondrichthyes and Osteichthyes); General Features of Fishes: Size, external features, body covering, skeleton, digestive, circulatory, osmoregulation, respiratory, reproductive, nervous, muscular systems, colors of fish, sense organs, sound production, electric organs and lateral line organs of fish; Swimming and Locomotion; Life History of Fish; Food and Feeding of Fish; Relations to Man.

BİY416 Aquaculture 2+0 4.0

Importance of Aquaculture; Methods in Aquaculture; Problems in Aquaculture Farm Construction and Water for Aquaculture; Fish farming Technology and Equipment; Culture of Cyprinus carpio; Oncorhynchus mykiss; Sparus auratus; Dicentrarchus labrax; Culture of the Shrimps; Culture of Plankton for Feeding Aquatic Animals; Nutrition in Aquaculture; Diseases and Parasite Problems in Aquaculture

BİY420 Biology Project II 0+4 7.0

Solving practical and theorical problems and practicing the knowledge obtained by students throughout the program; Students complete the experiments and collecting literature works, then write a Bachelor's degree thesis.

BİY420 (Eng) Biology Project II 0+4 7.0
Solving practical and theorical problems and practicing the knowledge obtained by students throughout the program; Students complete the experiments and collecting literature works, then write a Bachelor's degree thesis.

BİY421 (Eng) Molecular Biology of Development 2+0 4.0
History; Definitions and Objectives of Developmental Biology; Eukaryotic Cell Cycle and Its Regulation; Cellular Differentiation; The Universality of Development; Genomic Equivalence and Gene Expression; Developmental Potential; Determination by Cytoplasm Specification; Determination by Cell-Cell Interactions; Embryogenesis of Caenorhabditis elegans; Genetic Mechanism of Pattern Formation in Drosophila: Gradient and cascades, Homoerotic genes and homeobox motifs; Signaling Mechanisms and their Regulation; Stem Cells and Differentiation; Myogenesis; Hematopoiesis; miRNAs and Development; Apoptosis and Development.History; Definitions and Objectives of Developmental Biology; Eukaryotic Cell Cycle and Its Regulation; Cellular Differentiation; The Universality of Development; Genomic Equivalence and Gene Expression; Developmental Potential; Determination by Cytoplasm Specification; Determination by Cell-Cell Interactions; Embryogenesis of Caenorhabditis elegans; Genetic Mechanism of Pattern Formation in Drosophila: Gradient and cascades, Homoerotic genes and homeobox motifs; Signaling Mechanisms and their Regulation; Stem Cells and Differentiation; Myogenesis; Hematopoiesis; miRNAs and Development; Apoptosis and Development.

BİY424 Biology of Cancer 2+0 4.0
Cancer as a genetic disease and its history; Genetic variations in cancer; Variations in transform cells; Viruses and oncogenes as causing agents of cancer; Oncogenes and their proteins; Cancer types and their nomenclatures; Metastasize; Carcinogens and cancerogenicity; Cancerogenicity test methods; methods for cancer diagnosis; Molecular mechanisms of some cancer types; Recent treatment methods; Developing methods and latest studies; Avoiding cancer.

BİY426 General Parasitology 2+0 4.0
Concept of Parasitism and Parasites; Science of Parasitology; Symbiosis and Parasitism; Origin of Parasitism; Definitions of Parasites; Definitions of Hosts Ecology of Parasites; Naming Parasites; Taxonomy and Systematic of Parasites; Structural and Evolutional Adaptations in Parasites: Morphological adaptations, Embryonic and larval adaptations; Reproduction, Life Period and Cycles of Their Development; Interval and Vector Hosts and Their Origins; Parasitic Fauna and Its Environment: Features of hosts, Seasons and parasitic fauna; Relations between hosts and parasites: Effects of Parasites on hosts, Immunity, Specialty of hosts; Characters and Systematic of Parasitic Groups.

BİY427 Cosmetics Microbiology 2+0 4.0
Control of Microbial Contamination in Cosmetics and Non Sterile Pharmaceuticals; Hazards Assosiated with the Microbiological Contamination of Cosmetics and Pharmaceuticals; Control in Manufacture: Microbiological Control of Raw Material, Control of Microbial Contamination during Manufacture, Control Through Preservation; Natural and Physical Perspective Systems; The Effect of Container Materials and Multiple-Phase Formulation Components on the Activity of Antimicrobial Agents; Development of Preservative Systems; Microbial Resistance to Preservative Systems; Safety Evaluation of Preservatives; Microbiological Control Methods and Standarts.

BİY430 Genetic Toxicology 2+0 4.0
Definition and Extension of Genetic Toxicology; Importance of Mutations and Relation with Carcinogenesis; Physical and Chemical Agents Having Genotoxic Activity: Various physical mutagens and their effective mechanisms, Various chemical mutagens and their effective mechanisms; Metabolism of Genotoxic Agents: Metabolic activation systems and steps of metabolism; General Approach to Mutagenicity Test Systems.

BİY431 Introductory Bioinformatics 2+0 4.0
Definition and Introduction to Bioinformatics: Its relationship to basic Molecular Biology and other sciences; Description and use of GenBanks; Evaluation of nucleotide and amino acid sequences with web based programs by alignment (ClustalX, BLAST and Entrez); Web Based Restriction Enzyme Analyses of DNA Sequences (Webcutter); PCR Primary Dizayn and their Evaluation with web Based Programs; Use of Genetool and Peptool Package Programs.

BİY433 Plant Genetic Engineering 2+0 4.0
Gene Isolation and Cloning: Molecular structures of genes, Gene cloning strategies; Gen Transfer to Plants via Agro Bacterium: T-DNA transfer and its integration into the plant genome, Ti plasmids, Co-integrative and binary vectors; Direct Gene Transfer Techniques: Agro-infection, Macro-injection, Gene transfer via protoplasts, Gene transfer to cells and tissues; Development of Herbicide Resistant Transgenic Plants; Development of Insect Resistant Transgenic Plants; Development of Viruses Resistant Transgenic Plants; Proteins and Protein Engineering; Antisense RNA Technology; Ethic and Legal Aspects of Biotechnology.

BİY433 (Eng) Plant Genetic Engineering 2+0 4.0

Gene Isolation and Cloning: Molecular structures of genes, Gene cloning strategies; Gen Transfer to Plants via Agro Bacterium: T-DNA transfer and its integration into the plant genome, Ti plasmids, Co-integrative and binary vectors; Direct Gene Transfer Techniques: Agro-infection, Macro-injection, Gene transfer via protoplasts, Gene transfer to cells and tissues; Development of Herbicide Resistant Transgenic Plants; Development of Insect Resistant Transgenic Plants; Development of Viruses Resistant Transgenic Plants; Proteins and Protein Engineering; Antisense RNA Technology; Ethic and Legal Aspects of Biotechnology.

BİY434 Plant Biotechnology 2+0 4.0

Tissue Culture; Basic Laboratory Tecniques; Organogenesis; Somatic Embryogenesis; Protoplast Culture And Somatic Hybridization; Haploid Plant Growth; Secondary Metabolites Growth; Micropropagation; Germaplasm; Embryo Culture; Somaclonal Varyasyon; Transgenic plants.

BİY435 Hydrobotany 2+0 4.0

Classification of Aquatic Plants; Habitats for Aquatic Plants: Running waters, Springs, Lakes and seas, Physical and Chemical Features of these Environments; Algae: Ecological features of several algae groups growing in aquatic environment; Secondary Aquatic Plants: Aquatic ferns and Phanerogamae; Adaptations Coping with Aquatic Environment; Secondary Aquatic Plants in Running Waters, Lakes and Sea.

BİY436 Ethnobotanic 2+0 4.0

What Is Ethno Botanic?; Historical Evolution of Ethno Botanic; Quantitative Ethno Botanic; Natural Source Management; Ethno Botanic Methods; Ethno Botanically Useful Parts of Plants; Medical Plants; Industrial Plants; Agricultural Plants; Other Plants; Problem of Local And Scientific Names of Plants; Ethics In Ethno Botanical Studies; Uniting Public And Scientific Information.

BİY439 Microbial Biotechnology 2+0 4.0

Microorganisms and Biotechnology; Growing Microorganisms; Bioreactors; Fundamental Procedures in Biotechnology; Biotransformation;Enzyme Immobilization; Production of Secondary Metabolite by Microorganisms: Preparation of pre-induced inoculums, Preparation of fermentation medium, Fermentation, Assay of secondary metabolite, Isolation, purification and determination of secondary metabolite.

BİY440 Animal Toxins 2+0 4.0

Animal produced toxins: Description and classification; Composition and structure of animal toxins; Effect mechanisms of animal toxins; Effects on organisms: Effects on humans, Effects on Vertebrate, Effects on Invertebrate; The use of toxins in medical fields; Toxin producing animals.

BİY445 Biological Anthropology 2+0 4.0

The Definition of Anthropology and Anthropological Perspective; The Sub disciplines of Anthropology; The Method of Biological Anthropology; Homo sapiens and Other Animate Organisms; Primates; Biological and Behavioral Characteristics of Primates; Biological Diversity of Humans; Question of Race; The Development of Evolutionary Theory; The Mechanism of Evolution; The Evolution of Earth and Living Organisms; The Evolution of Primates; Hominids; The Evolution of Humans; The Origin of Homo Sapiens; Paleolithic Age and Cultural Evolution

BİY451 Diagnostic Microbiology 2+0 4.0

Isolation of pathogens from Clinical Specimens, Growth dependent identification methods, Testing cultures for antimicrobial drug sensitivity, Immunodiagnostics, Agglutination, Immunoelectron microscopy, Fluorescent antibodies, ELISA and Radioimmunoassay, Immunoblot procedures, Nucleic acid probes, Diagnostic virology.

BİY455 Microbial Physiology 2+0 4.0

Nutrition and Metabolism of Microorganisms; Energetic and Enzymes: Bioenergetics, Catalysis and Enzymes; Oxidation-Reduction and Energy-Rich Compounds: Electron Donors and Electron Acceptors, NAD as a Electron Carrier, Energy Storage; Essentials of Catabolism: Energy Conservation, Glycolysis, Respiration, Proton Motive Force, Catabolic Diversity; Essentials of Anabolism: Biosynthesis of Sugars and Polysaccharides, Biosynthesis of Amino acids and Nucleotides, Biosynthesis of Fatty Acids and Lipids, Regulation of Activity of Biosynthetic Enzymes.

BİY457 Molecular Genetics 2+0 3.0

Genetic Material; Nucleic Acids and Properties: DNA synthesis, Different DNA synthesis mechanisms in the living organisms; Structure and Types of Chromosomes; Recombination and its Types, Transformation, Transduction, Conjugation, Crossing over; DNA Repair Mechanisms; Mutation and its Types; Plasmid, Episome and Transposons; Gene Expression: Transcription and Splicing, Translation; Regulation of Gene: Genetic control in prokaryotes; Genetic Control in Eukaryotes; Proto Oncogenes and Oncogenes; Methods for Studying DNA.Genetic Material; Nucleic Acids and Properties: DNA synthesis, Different DNA synthesis mechanisms in the living organisms; Structure and Types of Chromosomes; Recombination and its Types, Transformation, Transduction, Conjugation, Crossing over; DNA Repair

Mechanisms; Mutation and its Types; Plasmid, Episome and Transposons; Gene Expression: Transcription and Splicing, Translation; Regulation of Gene: Genetic control in prokaryotes; Genetic Control in Eukaryotes; Proto Oncogenes and Oncogenes; Methods for Studying DNA.

BİY457 (Eng) Molecular Genetics 2+0 3.0

Genetic Material; Nucleic Acids and Properties: DNA synthesis, Different DNA synthesis mechanisms in the living organisms; Structure and Types of Chromosomes; Recombination and its Types, Transformation, Transduction, Conjugation, Crossing over; DNA Repair Mechanisms; Mutation and its Types; Plasmid, Episome and Transposons; Gene Expression: Transcription and Splicing, Translation; Regulation of Gene: Genetic control in prokaryotes; Genetic Control in Eukaryotes; Proto Oncogenes and Oncogenes; Methods for Studying DNA.Genetic Material; Nucleic Acids and Properties: DNA synthesis, Different DNA synthesis mechanisms in the living organisms; Structure and Types of Chromosomes; Recombination and its Types, Transformation, Transduction, Conjugation, Crossing over; DNA Repair Mechanisms; Mutation and its Types; Plasmid, Episome and Transposons; Gene Expression: Transcription and Splicing, Translation; Regulation of Gene: Genetic control in prokaryotes; Genetic Control in Eukaryotes; Proto Oncogenes and Oncogenes; Methods for Studying DNA.

BİY461 Biotechnology 2+0 3.0

History of Biyotechnology: From biology to biotechnology; Genetic Engineering: Transformation, Conjugation, Transduction, Gene cloning; Biotechnological Products: Enzymes, Antibiotics and other metabolites; Gene Therapy: Applications of viral gene therapy; Monoclonal Antibody Technologies: Monoclonal antibodies in diagnosis and therapy; Pharmacogenomics; Biomaterials; Tissue Engineering; Biocompatibility; Stem Cells; Protein Purification; Principles of Proteomics.

BİY462 Actinomycetes and Antibiotics of Actinomycetes 2+0 4.0

The habitat of actinomycetes; Methods of isolation and identification in actinomycetes; Morphology and cytology of actinomycetes; Nomenclature and systematics of actinomycetes; Physiological and biochemical properties of actinomycetes; Pathogenicity of actinomycetes; Genus Streptomyces; Antibiotics of actinomycetes, their production and medical importance; Production and medical importance of antibiotics of genus Streptomyces.

BİY465 Clinical Biochemistry 2+0 4.0

Importance of Enzymes in Clinical Diagnosis; Carbohydrate Metabolism Disorders; Plasma Lipids and Atherosclerosis; Importance of Clinical Diagnosis of Plasma Proteins; Liver and Kidney Function Tests; Iron Metabolism and Anemia; Endocrinology; Minerals and Bone Metabolism; Importance of Clinical Diagnosis of Tumor Markers; Biochemical Analysis in Blood, Urine and Feces; Analysis of Cerebrospinal Fluid and Other Body Fluids.

BİY467 (Eng) Conservation Biology 2+0 4.0

What is conservation biology? What is biological diversity? Threats to Biodiversity: Extinction, Vulnerability to extinction, Habitat destruction, Fragmentation, Degradation and global climate change, Overexploitation, Invasive species; Conservation of Populations and Species: In situ and ex situ conservation strategies, Practical applications, Establishing protected areas, Managing protected areas, Restoration ecology.

BİY468 Oxidative Stress and Antioxidants 2+0 4.0

Oxygen Toxicity; Free Radicals: Definition, Types and Formation mechanisms; Interaction of Free Radicals with Organic Molecules; Oxidative Stress; Cell, Tissue and Organs Dysfunctions as a Result of Oxidative Stress; Oxidative Stress and Diseases; Oxidative Stress and Aging; Oxidative Stress and Cancer; Endogen and Exogen Antioxidants; Antioxidant Systems; Determination of Oxidative Damage and Antioxidant Capacity in Experimental Studies.

BİY468 (Eng) Oxidative Stress and Antioxidants 2+0 4.0

Oxygen Toxicity; Free Radicals: Definition, Types and Formation mechanisms; Interaction of Free Radicals with Organic Molecules; Oxidative Stress; Cell, Tissue and Organs Dysfunctions as a Result of Oxidative Stress; Oxidative Stress and Diseases; Oxidative Stress and Aging; Oxidative Stress and Cancer; Endogen and Exogen Antioxidants; Antioxidant Systems; Determination of Oxidative Damage and Antioxidant Capacity in Experimental Studies.

BİY469 Forensic Entomology 2+0 4.0

Forensic Importance of Insects; Collection of Entomological Evidence During Death Investigation; Insect Succession on Carrion and Its Role in Determining the Time of Death; The Role of Aquatic Insects in Forensic Investigations; Estimating Postmortem Interval; Insect Development and Forensic Entomology: Laboratory rearing of forensic insects, Computer modeling of insect growth and its application to forensic entomology; Entomotoxicology: Insects as toxicological indicators and impact of drugs and toxins on insect development; DNA Techniques for Forensic Entomology.

BİY470 Environmental Biology 2+0 4.0

Concepts of Environmental Biology: Environmental components and pollution, Soil pollution, Water pollution, Air pollution, Noise pollution, Natural pollution; Environment Human Relationships: Population, Natural sources, Nutrition and energy; Environmental Health and Protecting Environmental Health; International Dimensions of Environment; Ecological Problems: Saving nature, Ecological balance, Prevention of pollution, Saving biological diversity, Environmental politics, Environmental economics, Environmental planning; Environmental Politics in Turkey; Environmental Problems in Turkey.

BİY471 Molecular Microbial Ecology 0+3 5.0

Introduction to molecular microbial ecology; Molecular techniques in microbial ecology: Isolation of nucleic acids, Amplification, Polymerase chain reaction (PCR), Fluorescence In Situ Hybridization (FISH), Denaturing Gradient Gel Electrophoresis (DGGE), Restriction digestion, Amplified Ribosomal DNA Restriction Analysis, 16S rDNA clone libraries, Sequence analysis; General overview.Introduction to molecular microbial ecology; Molecular techniques in microbial ecology: Isolation of nucleic acids, Amplification, Polymerase chain reaction (PCR), Fluorescence In Situ Hybridization (FISH), Denaturing Gradient Gel Electrophoresis (DGGE), Restriction digestion, Amplified Ribosomal DNA Restriction Analysis, 16S rDNA clone libraries, Sequence analysis; General overview.

BİY471 (Eng) Molecular Microbial Ecology 0+3 5.0

Introduction to molecular microbial ecology; Molecular techniques in microbial ecology: Isolation of nucleic acids, Amplification, Polymerase chain reaction (PCR), Fluorescence In Situ Hybridization (FISH), Denaturing Gradient Gel Electrophoresis (DGGE), Restriction digestion, Amplified Ribosomal DNA Restriction Analysis, 16S rDNA clone libraries, Sequence analysis; General overview.Introduction to molecular microbial ecology; Molecular techniques in microbial ecology: Isolation of nucleic acids, Amplification, Polymerase chain reaction (PCR), Fluorescence In Situ Hybridization (FISH), Denaturing Gradient Gel Electrophoresis (DGGE), Restriction digestion, Amplified Ribosomal DNA Restriction Analysis, 16S rDNA clone libraries, Sequence analysis; General overview.

BİY472 Nutritional Biochemistry 2+0 4.0

Introduction: Nutrient-nutrient element; an Overview of Metabolism: Catabolic-anabolic pathways, Regulation of metabolism; Carbohydrates: Metabolism of carbohydrates and disorders of carbohydrate metabolism; Lipids: Metabolism of triacylglycerols and cholesterol; Proteins: Disorders of amino acid metabolism; Nucleotids and Nucleic Acids: Metabolism of nucleotids, Gout disease; Enzymes: Regulation of enzyme activity; Hormones: Thyroid, Parathyroid, Pancreatic, Adrenal, Hypophysis and Gastrointestinal hormones; Vitamins: Factors affecting vitamin need and vitamin level, Fat and Water-soluble vitamins, Pseudovitamins; Minerals: Fundamental minerals, Essential and Non-essential minerals; Metabolism in Satiety and Starvation.

BİY472 (Eng) Nutritional Biochemistry 2+0 4.0

Introduction: Nutrient-nutrient element; an Overview of Metabolism: Catabolic-anabolic pathways, Regulation of metabolism; Carbohydrates: Metabolism of carbohydrates and disorders of carbohydrate metabolism; Lipids: Metabolism of triacylglycerols and cholesterol; Proteins: Disorders of amino acid metabolism; Nucleotids and Nucleic Acids: Metabolism of nucleotids, Gout disease; Enzymes: Regulation of enzyme activity; Hormones: Thyroid, Parathyroid, Pancreatic, Adrenal, Hypophysis and Gastrointestinal hormones; Vitamins: Factors affecting vitamin need and vitamin level, Fat and Water-soluble vitamins, Pseudovitamins; Minerals: Fundamental minerals, Essential and Non-essential minerals; Metabolism in Satiety and Starvation.

BİY473 Biophotography 2+0 4.0

Cameras (Types of cameras); Objectives Used in Cameras (Types of Objectives); Filters; Diaphragm and Its Uses; Obturator (screen); Visors and Visor Types; Macro and Micro Photography Techniques; Microscopes and Microscope Types Adaptable to Cameras; Use of Light; Period and Degree of Light Required; Defective Shooting and Its Reasons; Solutions Used in Photography; Developing a Film; Developing Films and Printing; Measuring by Photograph; Reading out Photographs.

BİY474 Medical Parasitology 0+3 5.0

Symbiosis; Parasite, Conceptions of Host and Vector; Parasitism: Effects of parasite on host, Effects of host on parasite, Sources of parasites; Result of Infection; Epidemiology of Parasitosis; Signs of Parasitosis; Diagnosis of Parasitosis: Diagnosis with active, Direct examination, Indirect diagnosis; Medical Treatment of Parasitosis; Fight with Parasitosis; Important Groups of Parasites on Human: Protozoon, Worms, Arthropods.

BİY475 Mycotoxins 2+0 4.0

Introduction: What is the mycotoxin, History of mycotoxins; Mycotoxin Producing Molds and Their Growth Requirements; Mycotoxin and Mycotoxigenic Fungi Formation and Environmental Factors; The Effects of Mycotoxins on Humans and Other Living Organisms; Toxins of Aspergillus and Production Mechanisms; Toxins of Penicillium and Production Mechanisms; Toxins of Fusarium and Production Mechanisms; Other Mycotoxins; Control of Mycotoxin Formation and Detoxification Pathways; Inhibition of Mycotoxin Formation; Mycotoxin Analysis Methods.

BİY476 Food Microbiology 2+0 4.0

Microorganisms Important in Food Microbiology: Bacteria, Yeasts, Moulds, Viruses; Microorganism Reservoirs for Contamination of Food; Factors Affecting Growth of Microorganisms in Food: pH, Water Activity, Oxidation reduction potential; Antimicrobial substances; Chemical Changes Caused by Microorganisms; Damage in Different Kinds of Food; Food-borne Poisonings; Mycotoxin Formation in Food; Indicator Microorganisms in Food and Isolation Methods.

BİY477 Microfungus Identification Methods 0+3 5.0

Mycology Laboratory; Isolation, Purification and maintaining of microfungi; Morphologic Identification Methods: Culture media, Inoculation and incubation conditions; Microscopic Investigation and Identification Keys; Identification of Common Microfungi; Zygomycetes; Identification of Common Microfungi: Aspergillus; Identification of Common Microfungi: Penicillium; Identification of Common Microfungi: Fusarium; Identification of Common Microfungi: Alternaria, Cladosporium, Stachybotrys; Chemical Identification of Microfungi; Molecular Identification of Microfungi; Molecular Identification of Microfungi.

BİY478 Plant Identification and Herbarium Techniques 0+3 5.0

Taxonomy; Principles of Systematic Studies: Subjects and Principles of Taxonomic Studies; Taxonomic Categories; Plant Nomenclature; Binominal Nomenclature; Plant Identification: Aim of the identification, Learning scientific names, Tools used in plant identification, Plant identification methods and using plant identification keys, Types of plant identification keys, Key using techniques, Herbarium techniques: Field study methods, Collecting the plant materials, Dried and labeled plant materials, Plant conservation and preservation methods, Herbarium methods of special plant taxa, Preparing plant database and herbarium managing systems.

BİY480 Industrial Microbiology 2+0 4.0

Soil Microbiology; Air Microbiology; Water Microbiology; Assimilation of Metal; Microbial Production of Biogas; Production of Hydrogen; Microbial Insecticides; Production of Single-Cell Protein; Baker's Yeast Production; Production of Ethyl Alcohol by Microorganisms; Production of Alcoholic Beverages; Antibiotic Production; Enzyme Production; Vitamin Production; Microbial Fat Production; Production of Amino Acids; Lactic Acid Production; Microbial Production of Citric Acid Acetone- Butanol Isopropanol Butyric Acid and Other Organic Acids.

BİY482 Introductory Molecular Biotechnology 2+0 4.0

Introduction to Molecular Biotechnology: Definition and its history, Biological systems in molecular biotechnology; Recombinant DNA Technology; Heterologous Protein Production in Prokaryotic and Eukaryotic Cells; Directed Multiple Mutagenesis and Protein Engineering; Molecular Diagnostics of Human Diseases Based on DNA; Human Therapeutic Genes; Recent Developments in Human Gene Therapy; Regulations on Biotechnological Patent Rights in Turkey and the World.

BİY484 Molecular Microbiology Techniques 0+3 5.0

DNA Extraction from Prokaryotic Cells I (Traditional Method); DNA Extraction from Prokaryotic Cells II (Commercial kit; RNA Extraction; Hybridization; 16S rRNA Amplification by Polymerase Chain Reaction Techniques; DNA Cloning; DNA Sequencing; Real-Time Polymerase Chain Reaction; Denaturing Gradient Gel Electrophoresis Technique; Fluoresceine in situ Hybridization Technique; Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis of the Whole Cell Bacterial Proteins.

BİY488 Biology Project I 0+4 7.0

Ethics in Science; Determining a Research Subject in Biology; Conducting a Literature Review on the Determined Subject in Biological and Other Abstracts: Researching about the determined subject by subject; Researching about the Determined Subject by Author, Researching about the determined subject by terminology; Introduction to the High-quality Journals in Biology; Using Catalogues of Chemicals and Equipment; Using Handbooks and Textbooks; Using the Internet: Obtaining data from the YÖK documentation center TÜBİTAK, and the other documentation centers; Evaluation of the Data; Creating a Project Schedule.Ethics in Science; Determining a Research Subject in Biology; Conducting a Literature Review on the Determined Subject in Biological and Other Abstracts: Researching about the determined subject by subject; Researching about the Determined Subject by Author, Researching about the determined subject by terminology; Introduction to the High-quality Journals in Biology; Using Catalogues of Chemicals and Equipment; Using Handbooks and Textbooks; Using the Internet: Obtaining data from the YÖK documentation center TÜBİTAK, and the other documentation centers; Evaluation of the Data; Creating a Project Schedule.

BİY488 (Eng) Biology Project I 0+4 7.0

Ethics in Science; Determining a Research Subject in Biology; Conducting a Literature Review on the Determined Subject in Biological and Other Abstracts: Researching about the determined subject by subject; Researching about the Determined Subject by Author, Researching about the determined subject by terminology; Introduction to the High-quality Journals in Biology; Using Catalogues of Chemicals and Equipment; Using Handbooks and Textbooks; Using the Internet: Obtaining data from the YÖK documentation center TÜBİTAK, and the other documentation centers; Evaluation of the Data; Creating a Project Schedule.Ethics in Science; Determining a Research Subject in Biology; Conducting a Literature Review on the

Determined Subject in Biological and Other Abstracts: Researching about the determined subject by subject; Researching about the Determined Subject by Author, Researching about the determined subject by terminology; Introduction to the High-quality Journals in Biology; Using Catalogues of Chemicals and Equipment; Using Handbooks and Textbooks; Using the Internet: Obtaining data from the YÖK documentation center TÜBİTAK, and the other documentation centers; Evaluation of the Data; Creating a Project Schedule.

BRİ101 Bridge 2+0 3.0

Introduction to Bridge; History; Basic Concepts; Bidding; Play; Hand Evaluation; Point Count; Opening Bids; Bidding Goals; Responses to one No-trump; More on Point Count; Responses to one of a Suit; Rebids by Opener; Declarer Play; Overcalls; Takeout Doubles; Two Club Opening; Weak Bids; No-Trump Structure; The Stayman Convention; Minor Suit Responses; Bidding after a Raise; Slam Bidding; Defensive Play.

ELE303 Electric Circuit Analysis 2+0 3.0

Voltage, Current, Resistance; Electrical Charge; Ohm's Law: Current, Calculations of voltage and resistance; Power in an Electric Circuit: Energy conversion, Power supplies; Current and Ohm's Law in a Series Circuit: Kirchhoff's voltage law, Voltage divider rule; Parallel Circuits: Voltage drop in parallel circuits, Kirchhoff's current law, Ohm's law in parallel circuits, Current sources in parallel circuits, Current divider rule, Open and short circuits; Circuit Theorems: Voltage source, Current source, Source conversions, Superposition theorem, Thevenin's theorem, Norton's theorem, Millman's theorem, Delta-to-wye (-Y) conversions, Circuit analysis with branch and mesh loop, Bridge circuits.

ELE304 Electric Circuit Analysis Laboratory 0+2 3.0

Description of Equipments Required for Experiments; Soldering Technique; Resistor and the Color Codes, Series dc Circuits; Parallel dc Circuits; Series and Parallel dc Circuits; Thevenin's Theorem; Thevenin Equivalent Circuits; Norton's Theorem; Norton Equivalent Circuits; Measurements of Input and Output Impedances.Description of Equipments Required for Experiments; Soldering Technique; Resistor and the Color Codes, Series dc Circuits; Parallel dc Circuits; Series and Parallel dc Circuits; Thevenin's Theorem; Thevenin Equivalent Circuits; Norton's Theorem; Norton Equivalent Circuits; Measurements of Input and Output Impedances.

ELE304 (Eng) Electric Circuit Analysis Laboratory 0+2 3.0

Description of Equipments Required for Experiments; Soldering Technique; Resistor and the Color Codes, Series dc Circuits; Parallel dc Circuits; Series and Parallel dc Circuits; Thevenin's Theorem; Thevenin Equivalent Circuits; Norton's Theorem; Norton Equivalent Circuits; Measurements of Input and Output Impedances.Description of Equipments Required for Experiments; Soldering Technique; Resistor and the Color Codes, Series dc Circuits; Parallel dc Circuits; Series and Parallel dc Circuits; Thevenin's Theorem; Thevenin Equivalent Circuits; Norton's Theorem; Norton Equivalent Circuits; Measurements of Input and Output Impedances.

ELO302 Application of Electronic Circuit Elements 2+0 3.0

General Information About the Structure of Semiconductors; P-n Junction; Threshold Voltage; Forward and Reverse Bias; Ohmic Contact; Substrate Cleaning Techniques; Metal-Semiconductor Contact and Schottky Diode; Bipolar Junction Transistor; Field Effect Transistor; Photodiode; Electrical Measurements of Some Electronic Circuit Elements.

ELO309 Electronic 2+0 3.0

Alternating Current and Voltage; Sine Wave; Sine Wave Voltage Sources; Voltage and Current Values of Sine Waves; Angular Measurement of a Sine Wave; Phasors and Complex Numbers; Complex Number System; Rectangular and Polar Forms; Capacitors; Inductors; Transformers; RC Circuits; RL Circuits; RLC Circuits; Filters; Diodes and Some Applications; Current-Voltage Characteristics of a Diode; Circuit Applications; Half Wave and Full Wave Rectifications; Special Diodes; Transistors (npn, pnp); Hybrid Parameters.

ELO310 Electronic Laboratory 0+2 3.0

Description of Equipments Required for Experiments; RC Circuits: RC time constant, Low-pass filter, High-pass filter; Clipping Circuits; Clamping Circuits; Voltage Doublers; Rectification: Half wave rectification, Full wave rectification, Bridge rectification; Diode Characteristics; Zener Diode Characteristics; Bipolar Junction Transistor Characteristics; Phase-Shift Measurements.Description of Equipments Required for Experiments; RC Circuits: RC time constant, Low-pass filter, High-pass filter; Clipping Circuits; Clamping Circuits; Voltage Doublers; Rectification: Half wave rectification, Full wave rectification, Bridge rectification; Diode Characteristics; Zener Diode Characteristics; Bipolar Junction Transistor Characteristics; Phase-Shift Measurements.

ELO310 (Eng) Electronic Laboratory 0+2 3.0

Description of Equipments Required for Experiments; RC Circuits: RC time constant, Low-pass filter, High-pass filter; Clipping Circuits; Clamping Circuits; Voltage Doublers; Rectification: Half wave rectification, Full wave rectification, Bridge rectification; Diode Characteristics; Zener Diode Characteristics; Bipolar Junction Transistor Characteristics; Phase-Shift Measurements.Description of Equipments Required for Experiments; RC Circuits: RC time constant, Low-pass filter, High-pass filter; Clipping Circuits; Clamping Circuits; Voltage Doublers; Rectification: Half wave rectification, Full wave

rectification, Bridge rectification; Diode Characteristics; Zener Diode Characteristics; Bipolar Junction Transistor Characteristics; Phase-Shift Measurements.

ELO402 Digital Electronics 2+0 3.0

Elements of digital logic, logic gates, truth tables, Boolean algebra and theorems, designing and minimizing logic circuits, analysis of logic circuits, electrical properties of TTL and CMOS logic circuits, combinational logic circuits (decoders, encoders, arithmetic logic units, multiplexer and demultiplexer circuits), latches and flip flops, flip-flop applications, designing sequential circuits, shift registers.

ESTÜ101 Introduction to University Life 0+1 2.0

Orientation: Concept of university and understanding of university, General information about Eskisehir, Education and student discipline regulations, Ethics at the university, National and international exchange programs, General services of university, Faculty/department orientations; Self-improvement seminars: Research projects, Entrepreneurship, Respect to diversity, Social gender, Leisure philosophy, Zero waste and sustainability, Career planning and mind mapping, Scientific thinking and observation, Barrier - free living, Carbon footprint, Start-up practices, Project based internship.

ESTÜ111 Volunteering Works 1+2 4.0

Management and Organization Concepts; The Concept of Volunteering and Volunteer Management; Fundamental Volunteering Areas (Disaster and Emergency, Environment, Education and Culture, Sports, Health and Social Services etc.); Project Development Related to Volunteer Work and Participation in Volunteer Work in the Field; Ethics, Moral, Religious, Traditional Values and Principles in Volunteer Work; Participation in Voluntary Work in Public Institutions, Local Governments and Non Government Organizations (NGOs); Risk Groups in Society and Volunteering; Immigrants and Volunteering.

ESTÜ112 Cyber Security for Everyone 2+0 2.0

Basic Concepts: Computer components and definitions; Software: System software, Application software; Computer Networks: Concept of Network and Internet; Malware and Network Attacks: Viruses, Attacks; Computer and Access Security: Password selection, File sharing, Backup; Internet security: SSL, Fake websites; Security on Social Platforms: Fake news and people; Security Analysis: System analysis, Network traffic analysis; System and Network Security: Network security, System security, Mobile device security; Information Security Management System: ISO 27001; Personal Data Protection Law: PDLP procedures; Information Technology Law: Information crimes and punishments.

ESTÜ113 Design Thinking 3+0 3.0

Design Thinking Concepts: Design thinking, Human-centered design, User research, Problem identification, Problem definition, Empathy, Idea development, Creativity, Idea elimination and selection, Low-precision prototyping, High-precision prototyping, User tests, Usage tests, Usability, Revision and iteration, Visual thinking, User-centered design, Design processes and innovation, applications, Presentation techniques.

ESTÜ114 Visual Thinking 3+0 3.0

Visual Thinking Concepts: Concepts of abstract and concrete, Point, Line, Surface, Volume, Composition, Repetition, Rhythm, Hierarchy, Harmony, Contrast, Measuring and scale; Presentation Techniques: Sketch, Color, Tone, Order; Visual Perception and Gestalt Theory: Figure-ground relationship, Proximity principle, Similarity principle, Completion principle, Continuity principle, Simplicity principle, Depth perception, Psychological effect; Visual Communication: Image reading, Image interpretation, Pictogram, Ideogram, Logotype.

ESTÜ115 Photographic Viewpoint 2+1 3.0

Course Introduction: Project work; Research and Discussion of the Project Subject: Evaluation of research results, Successful examples from photography and graphic art, Examination of examples of selected works, Determination of application subjects, Discussion of application possibilities, Basic design elements and principles in photography and graphic design process, Trial shooting and evaluation; Light and Lighting: Color and functions of color; Photography Techniques: Visual editing, Reading photographs; Methods and Techniques in Applied Photography: Technical evaluation of photographs and development stages of the photographs; Basic Rules of Composition in Photography: Perspective, Balance, Proportion, Texture, Shape, Perspective, Lens selection and application; Shooting Process and Graphic Interventions on Photographs; Photographic View Methods: Evaluation of shooting results; Preparation of Portfolio: Portfolio evaluation, Presentation methods and techniques, Exhibition preparation methods.

ESTÜ116 Computer Aided Design I 3+0 3.0

Concepts of Computer Aided Design: Introducing to fusion360, Introducing interface, Surface modeling, Solid modeling; Basic Commands: Sketching, Editing, Constraints, Timeline, Parameter modification, Technical drawing; Construction Commands: Create, Inspect, Insert; Surface Modeling Tools: Creating and editing surfaces; Assembly: Adjusting, Arranging, Joint, Additional options; Freeform Modeling: T-Splines, Surface creation, Surface editing, Symmetry and tools; Visualization: Assigning material, Scene settings, Rendering methods; Various Applications.

ESTÜ117 Computer Aided Design II 3+0 3.0

Concepts of Computer Aided Design: Surface and solid modeling, Differences between surface and solid modeling, Surface creation, Arrangement; Sheet Metal Processing: Sheet metal processing creation and editing; Advanced Modeling Tools: Product part modeling; Introduction to Simulation: FEA simulation, Analyzing and interpreting simulation results; Generative Design: Generative design concept, Generative design tools, Simulating and evaluating generative design results; Manufacturing Tools: 3D printing, Introduction to CAM, Introduction to electronics.

ESTÜ118 Visual Thinking with Concepts 3+0 3.0

Visual Thinking with Concepts: Perception as ability to know, Change of senses; Seeing and time, Seeing depth, Understanding shapes; Visual Perception: Abstraction; Static and dynamic concepts of abstraction, Context, Comparison of perception, Similarities; Image and thought: Mental images; Particular and spiritual images, Abstraction of the image, Perceived quantities, Geometry and meaning; Writing and speech: Words as images, Intuition and cognition, Perception of words, Verbal concepts and pictorial concepts; Vision in Education: Images and art, Looking and understanding, Visual education tools.

ESTÜ119 Flute 3+1 3.0

Breath Work: Breathing exercises the diaphragm and correctly use various activation studies; Technical Studies: Stance, Grip, Position, Fingering and embouchure work; Learning the Notes on the Flute: Learning the notes on the flute with octaves, The octave positions of the lip according to the study, A long blowing sound with learned notes; Technical Development; Proper Studies to be Determined by İnstructor According to Student's Performance on the Scales: With learned notes, Sharp, Flat, Major and Minor, According to the ranking exercises scales; Flute Repertoire in the Context of Period, Style and İnterpretation: Selected works according to student performance from periods in music history.

ESTÜ120 Solfege 3+1 3.0

Octave of the Tone to be Specified According to The Groups; The Signs Used in Writing Music; Signs Spelling Rules; Staff and Additional Lines; Arrays and Intervals; Major and Minor Scales, İnterests, and Varieties: Natural, Harmonic, Melodic; Measure and Time; The Terms of the Transaction; Marks of Dynamics; The Expression of Terms; According to Student Level and Profile to be Created Reading Pieces by the Teacher; Reading with Piano Accompaniment; Rhythmic Perception and Rhythmic Reading, and Only Two Voice Dictation Skills; to be Able to Read on Different Keys, to be Able to Read Complex Rhythmic Pieces with Piano Accompaniment Two, Three, Four-Voices Dictation Skills; Ability to Read Ceremonial Solfege, Atonal Solfege.

ESTÜ121 Piano 3+1 3.0

Starting Position on the Piano: By taking into consideration to correct position of hands, Arms, Fingers, And feet; Technical Development Exercises: Etudes, Scales, Chords and arpeggios studies; Techniques of Touching Piano Keyboard, Staccato, Legato, Non Legato; Information About Dynamics; Working with Learning Notes and Octaves: One hand and double hand into small pieces-small parts; Style and in the Context of Your Comment Piano Repertoire: Baroque, Classical, Romantic, And modern Turkish composers will be given according to the performance of student works.

ESTÜ122 Guitar 3+1 3.0

Theoretical studies: Writings symbols used in music; Basic information About Solfege; The Structural Characteristics of the Guitar; Guitar History; İntroduction to Guitar: Learning the notes on guitar; Learning the Names of the Right Hand and The Left Hand; Technical Exercises on the Guitar; Scales; Arpeggios; Slurs; Barres; Repertoire: Proper studies to be determined by instructor according to student's performance on the scales; To Recognition of the Different Disciplines During The Phase of Prima Vista; To Make Conscious About Playing Together; Improving to Stage Performance.

FEL401 Philosophy of Science 2+0 2.5

Importance and Definition of Science: Science, Common Sense, Religion and philosophy, Formal disciplines, Science and Language, Scientific Method: Its content and boundaries, Various interpretations; Ways arriving at the phenomenon: Observation and experimentation, Logical structure of measurement; Scientific Explanation: Notion scientific law, Verification of hypothesis, Causal principle in science, Structure and Functions of Scientific Theory; Human-problems of Science: Responsibility of Scientist, Science and HumanismImportance and Definition of Science: Science, Common Sense, Religion and philosophy, Formal disciplines, Science and Language; Scientific Method: Its content and boundaries, Various interpretations; Scientific Approach: Observation and experimentation, Logical structure of measurement, Scientific Explanation, Scientific law, Verification of hypothesis, Causal principle in science, Structure and Functions of Scientific Theory, Human-problems of Science; Responsibility of Scientist, Science and Humanism.

FİN305 Financial Mathematics 2+0 3.0

Simple Interest: Description and importance of interest, Calculation of simple interest, External interest; Simple Discount: Discount calculations related to external discount method, Discount calculations related to internal discount method, Equivalent notes, Consolidation of notes, Financial assets and calculation of interest in financial markets; Compound Interest

and Annuities; Normal Annuities; Debt Depreciation; Debt Pay-off with Equal Principals; Evaluation of Bonds and Stocks; Bond Valuation and Stock Valuation.

FİZ107 Physics Laboratory I 0+2 1.5

SI Unit System and Dimension Analysis; Measurement and Error Calculations; Graph Analysis; Principles of Experimental Studying and Preparation of Experimental Reports; Variation of Range due to Shooting Angle; Conservation of Energy; Motion with Constant Acceleration; Measurement of Angular Velocity; Determination of Moment of Inertia; Freely Falling; Simple Pendulum; Motion on Inclined Plane; Mass-spring System; Viscosity.

FİZ107 (Eng) Physics Laboratory I 0+2 1.5

SI Unit System and Dimension Analysis; Measurement and Error Calculations; Graph Analysis; Principles of Experimental Studying and Preparation of Experimental Reports; Variation of Range due to Shooting Angle; Conservation of Energy; Motion with Constant Acceleration; Measurement of Angular Velocity; Determination of Moment of Inertia; Freely Falling; Simple Pendulum; Motion on Inclined Plane; Mass-spring System; Viscosity.

FİZ108 Physics Laboratory II 0+2 1.5

Usage of Electrical Measuring Instruments; Security Rules in Electrical Experiments; Principles of Experimental Studying and Preparation of Experimental Reports; Parallel-Plate Capacitor; Investigation of Charge Distribution on Surface of any Conductor; Ohm's Law through DC Electric Circuits; Wheatstone Bridge; Electromagnetic Induction; Transformer; Determination of Emf and Inner Resistance; Determination of Frequency; Oscilloscope.

FİZ108 (Eng) Physics Laboratory II 0+2 1.5

Usage of Electrical Measuring Instruments; Security Rules in Electrical Experiments; Principles of Experimental Studying and Preparation of Experimental Reports; Parallel-Plate Capacitor; Investigation of Charge Distribution on Surface of any Conductor; Ohm's Law through DC Electric Circuits; Wheatstone Bridge; Electromagnetic Induction; Transformer; Determination of Emf and Inner Resistance; Determination of Frequency; Oscilloscope.

FİZ113 (Eng) Technical English 4+0 4.0

Technical English, Units in English, Physical Units and Concepts in English: Mechanical terms; Electric and Magnetic Terms; Modern Physics Terms; Thermodynamic Terms; Waves and Optic Terms, Mathematics and Operation Terms, Geometric Shapes in English.

FİZ115 Physics I 4+2 9.0

Physics and Measurement; Motion in One Dimension; Vectors; Motion in Two Dimensions; Newton's Laws; Applications of Newton's Laws; Circular Motion and Other Applications of Newton's Laws; Work and Kinetic Energy; Potential Energy and Conservation of Energy; Momentum, Collisions and Center of Mass; Rotation of Rigid Body About a Fixed Axis; Rolling Motion, Angular Momentum and Torque; Static Equilibrium and Elasticity.

FİZ115 (Eng) Physics I 4+2 9.0

Physics and Measurement; Motion in One Dimension; Vectors; Motion in Two Dimensions; Newton's Laws; Applications of Newton's Laws; Circular Motion and Other Applications of Newton's Laws; Work and Kinetic Energy; Potential Energy and Conservation of Energy; Momentum, Collisions and Center of Mass; Rotation of Rigid Body About a Fixed Axis; Rolling Motion, Angular Momentum and Torque; Static Equilibrium and Elasticity.

FİZ116 Physics II 4+2 9.0

Electric Charge; Coulomb's Law; Electric Fields; Gauss Law; Electric Potential; Calculation of Electric Field from Electric Potential; Capacitance and Dielectrics; Energy Storage Through A Capacitor; Current and Resistance; Direct Current Circuits; Effect of Magnetic Field; Sources of Magnetic Field; Faraday's Law; Electromagnetic Induction; Material and Magnetization; Inductance and Circuit Oscillations.

FİZ116 (Eng) Physics II 4+2 9.0

Electric Charge; Coulomb's Law; Electric Fields; Gauss Law; Electric Potential; Calculation of Electric Field from Electric Potential; Capacitance and Dielectrics; Energy Storage Through A Capacitor; Current and Resistance; Direct Current Circuits; Effect of Magnetic Field; Sources of Magnetic Field; Faraday's Law; Electromagnetic Induction; Material and Magnetization; Inductance and Circuit Oscillations.

FİZ117 Physics Laboratory I 1+2 4.0

Setting up a Mechanical Experiment; Working on variables, concepts and related quantities, data analysis process and methods; SI Unit System and Dimensional Analysis; Measurement and Error Calculations; Graph Analysis; Principles of Experimental Works and Preparation of Experiment Reports; Variation of Range due to Shooting Angle; Conservation of Energy; Motion with Constant Acceleration; Measurement of Angular Velocity; Determination of Moment of Inertia; Free

Falling; Simple Pendulum; Motion on an Inclined Plane; Mass-spring System; Viscosity.Setting up a Mechanical Experiment; Working on variables, concepts and related quantities, data analysis process and methods; SI Unit System and Dimensional Analysis; Measurement and Error Calculations; Graph Analysis; Principles of Experimental Works and Preparation of Experiment Reports; Variation of Range due to Shooting Angle; Conservation of Energy; Motion with Constant Acceleration; Measurement of Angular Velocity; Determination of Moment of Inertia; Free Falling; Simple Pendulum; Motion on an Inclined Plane; Mass-spring System; Viscosity.

FİZ117 (Eng) Physics Laboratory I 1+2 4.0

Setting up a Mechanical Experiment; Working on variables, concepts and related quantities, data analysis process and methods; SI Unit System and Dimensional Analysis; Measurement and Error Calculations; Graph Analysis; Principles of Experimental Works and Preparation of Experiment Reports; Variation of Range due to Shooting Angle; Conservation of Energy; Motion with Constant Acceleration; Measurement of Angular Velocity; Determination of Moment of Inertia; Free Falling; Simple Pendulum; Motion on an Inclined Plane; Mass-spring System; Viscosity.Setting up a Mechanical Experiment; Working on variables, concepts and related quantities, data analysis process and methods; SI Unit System and Dimensional Analysis; Measurement and Error Calculations; Graph Analysis; Principles of Experimental Works and Preparation of Experiment Reports; Variation of Range due to Shooting Angle; Conservation of Energy; Motion with Constant Acceleration; Measurement of Angular Velocity; Determination of Moment of Inertia; Free Falling; Simple Pendulum; Motion on an Inclined Plane; Mass-spring System; Viscosity.

FİZ118 Physics Laboratory II 1+2 4.0

Setting up an Electrical or an Magnetic Experiment; Working on variables, concepts and related quantities, data analysis process and methods; Using Electrical Measuring Instruments; Safety Rules in Electrical Experiments; Principles of Experimental Works and Preparation of Experiment Reports; Parallel-Plate Capacitor; Investigation of Charge Distribution on Surface of any Conductor; Ohm's Law through DC Electric Circuits; Wheatstone Bridge; Electromagnetic Induction; Transformer; Determination of Emf and Inner Resistance; Determination of Frequency; Oscilloscope.Setting up an Electrical or an Magnetic Experiment; Working on variables, concepts and related quantities, data analysis process and methods; Using Electrical Measuring Instruments; Safety Rules in Electrical Experiments; Principles of Experimental Works and Preparation of Experiment Reports; Parallel-Plate Capacitor; Investigation of Charge Distribution on Surface of any Conductor; Ohm's Law through DC Electric Circuits; Wheatstone Bridge; Electromagnetic Induction; Transformer; Determination of Emf and Inner Resistance; Determination of Frequency; Oscilloscope.

FİZ118 (Eng) Physics Laboratory II 1+2 4.0

Setting up an Electrical or an Magnetic Experiment; Working on variables, concepts and related quantities, data analysis process and methods; Using Electrical Measuring Instruments; Safety Rules in Electrical Experiments; Principles of Experimental Works and Preparation of Experiment Reports; Parallel-Plate Capacitor; Investigation of Charge Distribution on Surface of any Conductor; Ohm's Law through DC Electric Circuits; Wheatstone Bridge; Electromagnetic Induction; Transformer; Determination of Emf and Inner Resistance; Determination of Frequency; Oscilloscope.Setting up an Electrical or an Magnetic Experiment; Working on variables, concepts and related quantities, data analysis process and methods; Using Electrical Measuring Instruments; Safety Rules in Electrical Experiments; Principles of Experimental Works and Preparation of Experiment Reports; Parallel-Plate Capacitor; Investigation of Charge Distribution on Surface of any Conductor; Ohm's Law through DC Electric Circuits; Wheatstone Bridge; Electromagnetic Induction; Transformer; Determination of Emf and Inner Resistance; Determination of Frequency; Oscilloscope.

FİZ122 (Eng) English for Physicists 4+0 4.0

Technical Terms, Specialized Fields in Physics, Popular Technologies and Names in Physics, Introduction to Paper Writing, Sections of Paper, Tenses and Grammar of Paper, The Reader of ?Your Paper?, Common Mistakes To Avoid, Sample Papers.

FİZ124 Introduction to Metrology 2+0 3.0

Basic Terms and Concepts, International Metrology Systems: Scientific metrology, Industrial metrology, Legal metrology; Organizations Related to Metrology in Turkey; International System of Units; Measurement Uncertainty; Measuring Types: Length measurements, Time and frequency measurements, Temperature and humidity measurements, Electrical and magnetic measurements, Mass measurements and derived quantities, Photometric and radiometric measurements, Fluid measurements, Acoustic, ultrasonic and vibration measurements, Chemical metrology.

FİZ129 Physics I 4+0 6.0

Measurement and Units: Measurement, Units, Dimensional analysis; Vectors: Vector and scalar quantities, Coordinate systems and frames of reference; Kinematics: Motion in one dimension, Motion in two dimensions; Dynamics; Materials; Work and Energy; Momentum and Collisions; Fluids; Rotational Motion: Angular velocity and angular acceleration, Moments of inertia, Work and energy in rotational motion; Static Equilibrium.Measurement and Units: Measurement, Units, Dimensional analysis; Vectors: Vector and scalar quantities, Coordinate systems and frames of reference; Kinematics: Motion in one dimension, Motion in two dimensions; Dynamics; Materials; Work and Energy; Momentum and Collisions; Fluids; Rotational Motion: Angular velocity and angular acceleration, Moments of inertia, Work and energy in rotational motion; Static Equilibrium.

FİZ129 (Eng) Physics I 4+0 6.0

Measurement and Units: Measurement, Units, Dimensional analysis; Vectors: Vector and scalar quantities, Coordinate systems and frames of reference; Kinematics: Motion in one dimension, Motion in two dimensions; Dynamics; Materials; Work and Energy; Momentum and Collisions; Fluids; Rotational Motion: Angular velocity and angular acceleration, Moments of inertia, Work and energy in rotational motion; Static Equilibrium.Measurement and Units: Measurement, Units, Dimensional analysis; Vectors: Vector and scalar quantities, Coordinate systems and frames of reference; Kinematics: Motion in one dimension, Motion in two dimensions; Dynamics; Materials; Work and Energy; Momentum and Collisions; Fluids; Rotational Motion: Angular velocity and angular acceleration, Moments of inertia, Work and energy in rotational motion; Static Equilibrium.

FİZ130 Physics II 4+0 6.0

Electrostatic: Electric charge properties, Charging, Electroscope, Electric fields: Insulators and conductors, Coulomb's law, Electric flux, Gauss's law; Electric Potential: Potential difference, Potential energy, Obtaining the electric field from the electric potential; Capacitors: Definition and calculation of a capacitance, Capacitors with dielectrics, Energy stored in a charged capacitor, Electric dipole in an external electric field; Electric Current; Magnetic Field: Sources of the magnetic field, Electromagnetic induction.Electrostatic: Electric charge properties, Charging, Electroscope, Electric fields: Insulators and conductors, Coulomb's law, Electric flux, Gauss's law; Electric Potential: Potential difference, Potential energy, Obtaining the electric field from the electric potential; Capacitors: Definition and calculation of a capacitance, Capacitors with dielectrics, Energy stored in a charged capacitor, Electric dipole in an external electric field; Electric Current; Magnetic Field: Sources of the magnetic field, Electromagnetic induction.

FİZ130 (Eng) Physics II 4+0 6.0

Electrostatic: Electric charge properties, Charging, Electroscope, Electric fields: Insulators and conductors, Coulomb's law, Electric flux, Gauss's law; Electric Potential: Potential difference, Potential energy, Obtaining the electric field from the electric potential; Capacitors: Definition and calculation of a capacitance, Capacitors with dielectrics, Energy stored in a charged capacitor, Electric dipole in an external electric field; Electric Current; Magnetic Field: Sources of the magnetic field, Electromagnetic induction.Electrostatic: Electric charge properties, Charging, Electroscope, Electric fields: Insulators and conductors, Coulomb's law, Electric flux, Gauss's law; Electric Potential: Potential difference, Potential energy, Obtaining the electric field from the electric potential; Capacitors: Definition and calculation of a capacitance, Capacitors with dielectrics, Energy stored in a charged capacitor, Electric dipole in an external electric field; Electric Current; Magnetic Field: Sources of the magnetic field, Electromagnetic induction.

FİZ212 Statistical Physics 4+0 5.0

Processes of Probability in Statistical Physics; Basic Concepts in Statistical Physics: Macroscopic and microscopic cases, Entropy in Statistical Physics: Entropy and temperature, Variation of the entropy with energy; Distribution Functions: Maxwell-Boltzmann distribution function, Boson and fermions distribution functions; Portion Functions: Grand Canonic distribution, Mean values of the Canonic and Grand Canonic groups; Statistical Properties of the Fermions Systems: Density of states in the Fermi gas; Statistical Physics of the Boson Systems: Model of the Einstein, model of the Debye, Boson gas.

FİZ218 Modern Physics 4+0 6.0

Concept of Reference Frame; Definition of the Theory of Special and General Relativity; Special Relativity Theory; Galileo Transformations; Relativity of Time (Time dilation); Length Contraction; Lorentz Transformations; Doppler Effect; Relativity of Mass; Mass and Energy; Particle Properties of Waves; Photoelectric Effect; Quantum Theory of Light; X-ray Diffraction and Bragg's Law; Compton Effect; Pair Production; Photons and Gravity; Wave Properties of Particles; Wave Function; Particle Diffraction (Davisson-Germer Experiment); Particle in a Box; Uncertainty Principle; Atomic Structure: timeline; Thomson Model of the Atom; Rutherford Model of the atom; Electron Orbits; Atomic Spectra; Spectra Series; The Bohr Atom; Nuclear Motion; Atomic Excitation; Frank-Hertz Experiment; de Broglie Wavelength; Laser.Concept of Reference Frame; Definition of the Theory of Special and General Relativity; Special Relativity Theory; Galileo Transformations; Relativity of Time (Time dilation); Length Contraction; Lorentz Transformations; Doppler Effect; Relativity of Mass; Mass and Energy; Particle Properties of Waves; Photoelectric Effect; Quantum Theory of Light; X-ray Diffraction and Bragg's Law; Compton Effect; Pair Production; Photons and Gravity; Wave Properties of Particles; Wave Function; Particle Diffraction (Davisson-Germer Experiment); Particle in a Box; Uncertainty Principle; Atomic Structure: timeline; Thomson Model of the Atom; Rutherford Model of the atom; Electron Orbits; Atomic Spectra; Spectra Series; The Bohr Atom; Nuclear Motion; Atomic Excitation; Frank-Hertz Experiment; de Broglie Wavelength; Laser.

FİZ218 (Eng) Modern Physics 4+0 6.0

Concept of Reference Frame; Definition of the Theory of Special and General Relativity; Special Relativity Theory; Galileo Transformations; Relativity of Time (Time dilation); Length Contraction; Lorentz Transformations; Doppler Effect; Relativity of Mass; Mass and Energy; Particle Properties of Waves; Photoelectric Effect; Quantum Theory of Light; X-ray Diffraction and Bragg's Law; Compton Effect; Pair Production; Photons and Gravity; Wave Properties of Particles; Wave Function; Particle Diffraction (Davisson-Germer Experiment); Particle in a Box; Uncertainty Principle; Atomic Structure: timeline; Thomson Model of the Atom; Rutherford Model of the atom; Electron Orbits; Atomic Spectra; Spectra Series; The Bohr Atom; Nuclear Motion; Atomic Excitation; Frank-Hertz Experiment; de Broglie Wavelength; Laser.Concept of

Reference Frame; Definition of the Theory of Special and General Relativity; Special Relativity Theory; Galileo Transformations; Relativity of Time (Time dilation); Length Contraction; Lorentz Transformations; Doppler Effect; Relativity of Mass; Mass and Energy; Particle Properties of Waves; Photoelectric Effect; Quantum Theory of Light; X-ray Diffraction and Bragg's Law; Compton Effect; Pair Production; Photons and Gravity; Wave Properties of Particles; Wave Function; Particle Diffraction (Davisson-Germer Experiment); Particle in a Box; Uncertainty Principle; Atomic Structure: timeline; Thomson Model of the Atom; Rutherford Model of the atom; Electron Orbits; Atomic Spectra; Spectra Series; The Bohr Atom; Nuclear Motion; Atomic Excitation; Frank-Hertz Experiment; de Broglie Wavelength; Laser.

FİZ229 Mathematical Methods in Physics I 4+0 6.0

Vector Analysis: Coordinate systems, Ordinary derivatives and partial derivatives of vector functions, Line integrals, Divergence theorem, Green's Theorem, Stoke's theorem; Matrices and Determinants: Linear vector spaces; Basic matrix calculations, Special matrices, Eigenvalues and eigenvectors of matrices, Calculation of determinant of a matrix, Similarity transformations; Integral Transforms and Physical Applications: Gamma and Beta functions, Laplace transforms, Fourier transforms, Fourier, Sine and cosine series, Physical applications.Vector Analysis: Coordinate systems, Ordinary derivatives and partial derivatives of vector functions, Line integrals, Divergence theorem, Green's Theorem, Stoke's theorem; Matrices and Determinants: Linear vector spaces; Basic matrix calculations, Special matrices, Eigenvalues and eigenvectors of matrices, Calculation of determinant of a matrix, Similarity transformations; Integral Transforms and Physical Applications: Gamma and Beta functions, Laplace transforms, Fourier transforms, Fourier, Sine and cosine series, Physical applications.

FİZ229 (Eng) Mathematical Methods in Physics I 4+0 6.0

Vector Analysis: Coordinate systems, Ordinary derivatives and partial derivatives of vector functions, Line integrals, Divergence theorem, Green's Theorem, Stoke's theorem; Matrices and Determinants: Linear vector spaces; Basic matrix calculations, Special matrices, Eigenvalues and eigenvectors of matrices, Calculation of determinant of a matrix, Similarity transformations; Integral Transforms and Physical Applications: Gamma and Beta functions, Laplace transforms, Fourier transforms, Fourier, Sine and cosine series, Physical applications.Vector Analysis: Coordinate systems, Ordinary derivatives and partial derivatives of vector functions, Line integrals, Divergence theorem, Green's Theorem, Stoke's theorem; Matrices and Determinants: Linear vector spaces; Basic matrix calculations, Special matrices, Eigenvalues and eigenvectors of matrices, Calculation of determinant of a matrix, Similarity transformations; Integral Transforms and Physical Applications: Gamma and Beta functions, Laplace transforms, Fourier transforms, Fourier, Sine and cosine series, Physical applications.

FİZ230 Mathematical Methods in Physics II 4+0 6.0

Complex Numbers: Complex plane, Algebra of complex numbers, Euler Formula, Roots and powers of complex numbers, Exponential and trigonometric functions, Hyperbolic functions, Derivatives and integrals of functions with complex variable, Residue theorem and applications, Taylor and Laurent series; Orthogonal Functions: Orthogonal polynomials and solutions of differential equations of polynomials, Legendre, Hermite and Laguerre polynomials, Bessel functions, Associated Legendre polynomials and spherical harmonics.Complex Numbers: Complex plane, Algebra of complex numbers, Euler Formula, Roots and powers of complex numbers, Exponential and trigonometric functions, Hyperbolic functions, Derivatives and integrals of functions with complex variable, Residue theorem and applications, Taylor and Laurent series; Orthogonal Functions: Orthogonal polynomials and solutions of differential equations of polynomials, Legendre, Hermite and Laguerre polynomials, Bessel functions, Associated Legendre polynomials and spherical harmonics.

FİZ230 (Eng) Mathematical Methods in Physics II 4+0 6.0

Complex Numbers: Complex plane, Algebra of complex numbers, Euler Formula, Roots and powers of complex numbers, Exponential and trigonometric functions, Hyperbolic functions, Derivatives and integrals of functions with complex variable, Residue theorem and applications, Taylor and Laurent series; Orthogonal Functions: Orthogonal polynomials and solutions of differential equations of polynomials, Legendre, Hermite and Laguerre polynomials, Bessel functions, Associated Legendre polynomials and spherical harmonics.Complex Numbers: Complex plane, Algebra of complex numbers, Euler Formula, Roots and powers of complex numbers, Exponential and trigonometric functions, Hyperbolic functions, Derivatives and integrals of functions with complex variable, Residue theorem and applications, Taylor and Laurent series; Orthogonal Functions: Orthogonal polynomials and solutions of differential equations of polynomials, Legendre, Hermite and Laguerre polynomials, Bessel functions, Associated Legendre polynomials and spherical harmonics.

FİZ231 Waves and Optics 4+0 5.0

Oscillatory Motion: Simple harmonic motion, Mass-spring system and pendulums, Conservation of energy, Damped and forced oscillations, Resonance; Mechanical Waves: Harmonic waves, Speed of a transverse wave, Energy in wave motion, Superposition and interference of waves, Standing waves; Sound Waves; Speed of sound waves, Interference of sound waves, The Doppler effect; The Nature of Light and Geometric Optics: The nature of light, Reflection and refraction, Huygens principle, Mirrors and lenses; Physical Optics: Interference, Diffraction, Polarization.

FİZ233 Waves and Optics Laboratory 0+2 3.0

Introduction to Laboratory and The Various Equipments-Instruments Used in the Laboratory; Simple Harmonic Motion; Standing Waves; Reflection and Refraction in Wave Tank; Determination of the Propagation Speed of Sound in Air; Geometric Optics; Determination of The Focal Length in Mirrors and Lenses; Young's Double-Slit Experiment; Polarization; Refractive Index and Dispersion; Single and Multi-Slit Diffraction.Introduction to Laboratory and The Various

Equipments-Instruments Used in the Laboratory; Simple Harmonic Motion; Standing Waves; Reflection and Refraction in Wave Tank; Determination of the Propagation Speed of Sound in Air; Geometric Optics; Determination of The Focal Length in Mirrors and Lenses; Young's Double-Slit Experiment; Polarization; Refractive Index and Dispersion; Single and Multi-Slit Diffraction.

FİZ233 (Eng) Waves and Optics Laboratory 0+2 3.0

Introduction to Laboratory and The Various Equipments-Instruments Used in the Laboratory; Simple Harmonic Motion; Standing Waves; Reflection and Refraction in Wave Tank; Determination of the Propagation Speed of Sound in Air; Geometric Optics; Determination of The Focal Length in Mirrors and Lenses; Young's Double-Slit Experiment; Polarization; Refractive Index and Dispersion; Single and Multi-Slit Diffraction.Introduction to Laboratory and The Various Equipments-Instruments Used in the Laboratory; Simple Harmonic Motion; Standing Waves; Reflection and Refraction in Wave Tank; Determination of the Propagation Speed of Sound in Air; Geometric Optics; Determination of The Focal Length in Mirrors and Lenses; Young's Double-Slit Experiment; Polarization; Refractive Index and Dispersion; Single and Multi-Slit Diffraction.

FİZ235 Basic Information at Experimental Research 2+0 3.0

Basic Knowledge About Safe Usage of Laboratory Equipment; Use of Chemicals and Safety; Mechanical and Chemical Cleaning of the Samples; Materials Characterization Techniques, Basic components of the Characterization Laboratory; Appropriate Sample Selection Technique; Sample Selection and Preparation for the Optical and Electrical Measurements; Some Optical Measurements of the Sample; Some Electrical Measurements of the Sample.

FİZ259 (Eng) Seminar in Physics 2+0 3.0

What Are Seminars For; How To Give A Good Seminar: Guideline for the presentation, Sample presentation; How To Write A Short Report: Guideline for the report; A Seminar Experience For Senior Physics Majors: Variety of research fields in physics or subjects in context of physics.

FİZ304 Clean Energy Sources 2+0 3.0

Energy Sources, Solar Energy: Introduction, Solar angles, Solar radiation, Solar collector, Solar-power plants, Usage of solar energy in heating and in cooling; Geothermal energy: Introduction, Benefiting from geothermal fluid in electric energy generation, Potential of geothermal energy in Turkey; Wind energy: Introduction, Benefit from wind energy in electric energy generation; Hydrogen energy: Introduction, System of hydrogen energy, Methods of production hydrogen energy, Methods of production hydrogen energy, Fields of hydrogen use, Clean energy sources of Turkey.

FİZ307 Electromagnetic Theory I 4+0 6.0

Vector Analysis and Algebra: Spherical and cylindrical coordinate systems, Vector and scalar products; Coulomb's Law and Electric Field Intensity: Electric flux intensity, Electric fields of line and surface charges, Gauss law and its applications, Divergence theorem and vector operator; Energy and Potential: Potential gradient, Potential of charge, Dipole, Energy density in the electrostatic field; Conductors, Dielectrics and Capacitance: Metallic conductors, Conductor properties and boundary conditions, Semiconductors, The nature of dielectric materials, Boundary conditions for perfect dielectric materials.

FİZ308 Electromagnetic Theory II 4+0 6.0

The Steady Magnetic Fields: Biot-Savart's law, Stokes theorem, Magnetic flux density, Maxwell equations, Scalar and vector magnetic potentials, Magnetic Forces and the Nature of Magnetic Materials: Magnetization and permeability, Magnetic boundary conditions, Magnetic circuit, Potential energy and forces in magnetic materials, Inductance; Time-varying Fields and Maxwell's Equations: Faraday's law, Displacement current; Uniform Plane Wave: Wave motion in free space and perfect dielectrics, Poynting vector, Applications of electromagnetic waves.

FİZ312 Applications of Computer in Physics Laboratories 2+0 3.0

Using of Computer in Physics Experiments; Data Acquisition on Measuring Systems via Computer, Data Processing: Data Processing methods, Pocket Programs; The Using programs of Managed Measuring Devices; Measurement and Processing: Sending of data, obtained from measurement to computer, Processing of data sent to computer, Sampling on Measurement and Calculations.

FİZ315 Quantum Physics Laboratory I 0+2 3.0

Frank-Hertz Experiment: determination of the quantization of atomic energy levels; Emission and absorption spectrums: observation of the line spectrums; Determination of e/m: Determination of the charge of electron.

FİZ315 (Eng) Quantum Physics Laboratory I 0+2 3.0

Frank-Hertz Experiment: determination of the quantization of atomic energy levels; Emission and absorption spectrums: observation of the line spectrums; Determination of e/m: Determination of the charge of electron.

FİZ316 Quantum Physics Laboratory II 0+2 3.0

Experiment of the Balmer series of hydrogen: Determination of first three wavelength of the Balmer series of hydrogen; Experiment of Zeeman effect; Milikan's experiment: Determination of the electrical charge of the electron, Experiment of Electron Spin Resonance; Radioactivity: Characteristic of a Geiger-Muller tube with no radiation source; Experiment for different radiation types: Testing for different radiation types using a magnetic field.

FİZ316 (Eng) Quantum Physics Laboratory II 0+2 3.0

Experiment of the Balmer series of hydrogen: Determination of first three wavelength of the Balmer series of hydrogen; Experiment of Zeeman effect; Milikan's experiment: Determination of the electrical charge of the electron, Experiment of Electron Spin Resonance; Radioactivity: Characteristic of a Geiger-Muller tube with no radiation source; Experiment for different radiation types: Testing for different radiation types using a magnetic field.

FİZ318 Introduction to Heat Transfer 2+0 3.0

Introduction to Heat Transfer: The fundamental concepts, The importance of heat transfer, The basic modes of heat transfer; Heat Transfer by Conduction: Fourier's Law, Thermal conductivity, Thermal conductance, Thermal conduction resistance; Heat Transfer by Convection: Viscous flow and viscosity, The equation of momentum, Newton's law of cooling, Convection heat transfer coefficient; Heat Transfer by Radiation: Physical mechanism, Heat radiation's laws, Radiation heat transfer coefficient; Heat Transfer by Combination: The composite plane wall, Heat transfer by combined conduction and convection, Heat transfer by combined convection and radiation, The energy equality of the surface.

FİZ321 Semiconductors 2+0 3.0

Structure of Matter: Motion of charged particles in electric and magnetic fields, The Bohr model of the atom, Energy levels, Atomic excitation, Crystal and non-crystal line structure; Crystal defects; Semiconductor: Intrinsic semiconductor, Electron and hole, Extrinsic semiconductor (p and n-type), Fermi energy level, Mass-action law, Electrical conductivity, Mobility, Hall effect, Diffusion current, Einstein relation, Generation and recombination, Work function, Contact potential.

FİZ321 (Eng) Semiconductors 2+0 3.0

Structure of Matter: Motion of charged particles in electric and magnetic fields, The Bohr model of the atom, Energy levels, Atomic excitation, Crystal and non-crystal line structure; Crystal defects; Semiconductor: Intrinsic semiconductor, Electron and hole, Extrinsic semiconductor (p and n-type), Fermi energy level, Mass-action law, Electrical conductivity, Mobility, Hall effect, Diffusion current, Einstein relation, Generation and recombination, Work function, Contact potential.

FİZ322 Semiconductors Devices 2+0 3.0

P-N Junctions: Current-voltage characteristics, Forward bias, Reverse bias, Saturation current, Dynamic resistance, Breakdown, Junction capacitance, Rectification, Maximum frequency; Special Diodes: Zener diode, Tunnel diode, Varactors, Transistors: p-n-p and n-p-n junction transistors, Fundamentals of junction transistor operation, Transistor currents, Field effect transistor (FET), n-channel junction field effect transistor (JFET) and drain characteristic, Metal-oxide-semiconductors field effect transistor (MOSFET), Thyristors, Silicon controlled rectifier (SCR), Integrated circuits; Solar Cells.

FİZ322 (Eng) Semiconductors Devices 2+0 3.0

P-N Junctions: Current-voltage characteristics, Forward bias, Reverse bias, Saturation current, Dynamic resistance, Breakdown, Junction capacitance, Rectification, Maximum frequency; Special Diodes: Zener diode, Tunnel diode, Varactors, Transistors: p-n-p and n-p-n junction transistors, Fundamentals of junction transistor operation, Transistor currents, Field effect transistor (FET), n-channel junction field effect transistor (JFET) and drain characteristic, Metal-oxide-semiconductors field effect transistor (MOSFET), Thyristors, Silicon controlled rectifier (SCR), Integrated circuits; Solar Cells.

FİZ324 Superconductors 2+0 3.0

The History of Superconductivity; Basic Concepts in Superconductivity; Magnetic Properties of Superconductors; First and Second Type of Superconductors; Vortexes and Network of Abrikosov ; Pinning Centers, Flux tubes, Pinning of vortex, Motion of vortexes; Vortexes through Second Type of Superconductors and Relation between M-H ; Cooper Pairs; High Temperature Superconductivity, Properties and crystal structure of superconductors with high critical temperatures; Bi2Sr2Can-1CunO2n+4+y system, Structures based on bismuth; Techniques of Preparation of Superconductive Materials, Solid state reaction method, Melting method, Melting growth method, Other methods; The Future and Use of Superconductors, MAGLEV train, Applications of superconductors on particle accelerators, Magnetic resonance imaging, SQUID (Superconductor Quantum Interference Device).

FİZ325 Applications of Computer in Physics 2+0 3.0

Mathematica Notebook: Using notebook, Getting help, Preparing input, Starting calculations. Numerical Calculations: Arithmetic operations, Some mathematical functions, Matrices, Numerical solution of polynomial equations, Integration,

Numerical solution of differential equation; Symbolic Calculations: Transforming algebraic expressions, Equation solving, Differentiation, Integration, Sum, Power series, Limits, Solving differential equation. Graphics: Two-dimensional graphics, Three-dimensional graphics. Applications: Solving of problems in mechanics, electricity and magnetism quantum physics.

FİZ327 Quantum Physics I 4+0 6.0

Birth of Quantum Physics; Uncertainty Relations; Schrödinger Wave Equation; Probability Interpretation of Wave Function; Expectation Values; Time Independent Schrödinger Equation; One Dimensional Models; Potential Step; Potential Barrier; Potential of a Square Well; Potential of an Infinite Well; Harmonic Oscillator; General Formalism of Quantum Mechanics; Wave Function Space; Superposition Theorem; Dirac Bra-Ket Notation; Specific Operators, Angular Momentum, Angular Momentum Eigenfunctions.Birth of Quantum Physics; Uncertainty Relations; Schrödinger Wave Equation; Probability Interpretation of Wave Function; Expectation Values; Time Independent Schrödinger Equation; One Dimensional Models; Potential Step; Potential Barrier; Potential of a Square Well; Potential of an Infinite Well; Harmonic Oscillator; General Formalism of Quantum Mechanics; Wave Function Space; Superposition Theorem; Dirac Bra-Ket Notation; Specific Operators, Angular Momentum, Angular Momentum Eigenfunctions.

FİZ327 (Eng) Quantum Physics I 4+0 6.0

Birth of Quantum Physics; Uncertainty Relations; Schrödinger Wave Equation; Probability Interpretation of Wave Function; Expectation Values; Time Independent Schrödinger Equation; One Dimensional Models; Potential Step; Potential Barrier; Potential of a Square Well; Potential of an Infinite Well; Harmonic Oscillator; General Formalism of Quantum Mechanics; Wave Function Space; Superposition Theorem; Dirac Bra-Ket Notation; Specific Operators, Angular Momentum, Angular Momentum Eigenfunctions.Birth of Quantum Physics; Uncertainty Relations; Schrödinger Wave Equation; Probability Interpretation of Wave Function; Expectation Values; Time Independent Schrödinger Equation; One Dimensional Models; Potential Step; Potential Barrier; Potential of a Square Well; Potential of an Infinite Well; Harmonic Oscillator; General Formalism of Quantum Mechanics; Wave Function Space; Superposition Theorem; Dirac Bra-Ket Notation; Specific Operators, Angular Momentum, Angular Momentum Eigenfunctions.

FİZ328 Quantum Physics II 4+0 6.0

Schrödinger Equation in Three Dimensions; Spherical Symmetric Potential; Radial Schrödinger Equation; Hydrogen Atom, Matrix Representation of Linear Operators; Spin; Interactions With Respect to Spin; Approximate Methods and Perturbation Theory; Perturbation Expansion; Time Independent Perturbation Theory; Interaction of Charged Particles with Electromagnetic Field; Landau Levels.Schrödinger Equation in Three Dimensions; Spherical Symmetric Potential; Radial Schrödinger Equation; Hydrogen Atom, Matrix Representation of Linear Operators; Spin; Interactions With Respect to Spin; Approximate Methods and Perturbation Theory; Perturbation Expansion; Time Independent Perturbation Theory; Interaction of Charged Particles with Electromagnetic Field; Landau Levels.

FİZ328 (Eng) Quantum Physics II 4+0 6.0

Schrödinger Equation in Three Dimensions; Spherical Symmetric Potential; Radial Schrödinger Equation; Hydrogen Atom, Matrix Representation of Linear Operators; Spin; Interactions With Respect to Spin; Approximate Methods and Perturbation Theory; Perturbation Expansion; Time Independent Perturbation Theory; Interaction of Charged Particles with Electromagnetic Field; Landau Levels.Schrödinger Equation in Three Dimensions; Spherical Symmetric Potential; Radial Schrödinger Equation; Hydrogen Atom, Matrix Representation of Linear Operators; Spin; Interactions With Respect to Spin; Approximate Methods and Perturbation Theory; Perturbation Expansion; Time Independent Perturbation Theory; Interaction of Charged Particles with Electromagnetic Field; Landau Levels.

FİZ329 Semiconductors Laboratory 2+0 3.0

Fourteen Different Bravais Lattice and Solid Sphere Crystal Models; Measurement of the Distances Between Reflection Planes by Using X-ray Diffraction Patterns; Determination of the Optical Properties of the Various Materials Via Optical Absorption Spectra; Determination of the Current-voltage Characteristic of Different Materials; Conversion of Radiation Energy into Electrical Energy.

FİZ330 Semiconductor Applied Laboratory 2+0 3.0

Measurement of the Thickness of the Different Materials by Means of the Ellipsometer; Polarize Microscope; Photoconductivity; Luminescence experiment; Hall Effect Experiment; The Determination of Energy Band Gap of Germanium; The determination of the Electrical Conductivity of the Silicon single crystal depending on the temperature.

FİZ331 Nobel Prizes on Physics 2+0 3.0

What Are the Nobel Prizes Given For; Nobel Prizes in Physics From 1901 to 1920; Nobel Prizes in Physics From 1921 to 1940; Nobel Prizes in Physics From 1941 to 1960; Nobel Prizes in Physics From 1961 to 1970; Nobel Prizes in Physics from 1971 to 1980; Nobel Prizes in Physics From 1981 to 1990; Nobel Prizes in Physics From 1991 to 2000; Nobel Prizes in Physics From 2001 to 2010; Nobel Prizes in Physics from 2010 to This Year; Some Classifications About Nobel Prizes.

FİZ332 Introduction to Low Temperature Physics 2+0 3.0

Vacuum, Vacuum Pumps; Pressure Gages; Leak Detectors; Cryoliquids; Properties of Solids at Low Temperatures; Heat Transfer; Thermal Noise; Thermal Isolation; Cryoliquid Transfers; Refrigerators and Refrigerator Types; Low Temperature Sensors; Instrumentation of Cryogenics.

FİZ333 Quality Control Methods in Physics 2+0 3.0

Aspects of Physics In Scope of Industrial Cooperation in Turkey; Quality: Definition of quality, Primary element of quality, Factors affecting quality; Quality Control: Aim of the quality control, Requirement for quality control, Department of quality control, Total quality management; Destructive quality control: Tension, compression and bending test methods; Non-Destructive Quality Control: Eddy current method, Magnetic particle method, Liquid penetrant method, Ultrasonic testing, Radiographic methods.

FİZ334 History of Science 2+0 3.0

Development of Ideas About Moment and Universe in Ancient Civilizations: Natural and forced movement of astronomical objects; Aristoteles' Natural Philosophy; Archimedes' Contributions to Physics; Alexandra Mechanical School; Development in Physics in Islamic Civilization: Ibn al Haytham's studies on light; Development in Physics Before Modern Science Age: Copernicus? and Kepler's Universe Models, Tycho Brache; Physics in XVIIth Century: Galilei Galileo, Descartes, Newton and mathematical explanation of universe; Physics in XVIIIth and XIXth centuries: Falling down of classical physics and development caused to quantum physics; Theories of Special and General Relativity; Birth and Development of Quantum Physics.

FİZ335 Physical Events and Comments 2+0 3.0

To explain natural phenomena such as lightning, thunder, sun and lunar eclipses and to express properly with a Turkish; to interpret the various events observed; to interpret the experimental data and to reach a conclusion; to explain the events in various fields of physics such as mechanics, optics and electricity using the laws of physics and to express with Turkish language correctly with verbally and in writing.

FİZ336 Solar Photouoltaics 2+0 3.0

Introduction to Solar Photovoltaic (PV): A history of PV; Silicon PV: Semiconductors and doping, pn junction, The PV effect, Monocrystalline silicon cells; Crystalline PV: Polycrystalline silicon, Silicon ribbons and sheets, Gallium arsenide; Thin Film PV: Amorphous silicon, Other thin film PV Technologies; Other PV Technologies: Multijunction PV cells, Concentrating PV systems, Silicon spheres, Photoelectrochemicals cells; Electrical characteristics of silicon PV cells and modules; PV systems for power; Costs of energy from PV; Environmental impact and safety of PV systems.

FİZ337 Solar Energy and Applications 2+0 3.0

Introduction: Power and energy, Energy sources; Solar Energy: Structure of the Sun, The solar constant, The solar radiation spectrum, The Sun's total radiation; Solar radiation measurement, Solar radiation recorder, Solar energy measurement, Geometry of solar radiation, Latitude and longitude, Inclination, Sun angles; Solar energy applications: Solar collectors, Heating the buildings with solar energy, Active and passive solar heating systems.

FİZ338 (Eng) Labview and Data Acquisition 2+0 3.0

Introduction to Virtual Instrumentation and Data Acquisition; LabVIEW as a Virtual Instrument: Front panel, Block diagram; LabVIEW Environment: Menus, Palettes, Opening, Loading, Saving VIs; Programming: Data flow programming, ?G? Programming, Data types, Representations and precision, Wiring, Editing and debugging, Creating subVIs; Structures: For loop, While loop, Shift registers and feedback nodes, Case structures, Sequence structures, The Formula Node; Arrays and Clusters: Single and multidimensional arrays, Cluster functions; Charts and Graphs: Waveform charts, Waveform graphs, XY graphs; Strings and File Input/Output: String functions, Writing data to a file, Reading data from a file; Components of a Data Acquisition (DAQ) System; Common Instrument Interfaces: RS232, GPIB, VISA, USB; Instrument Control in LabVIEW.

FİZ339 Radioecology and Ecosystem 2+0 3.0

Ecosystem: Physical and biological components of ecosystem, The causes instability, disorder, harm or discomfort to the ecosystem; Air Pollution, Water Pollution, Light Pollution, Radioactive Pollution; Radioecology: What is radioecology, Radioactivity, Units of radioactivity and dose, What is the source of radioactivity? Natural sources of radiation, Why is radon gas a problem? Synthetic radioactivity and, its use for a variety of purposes, Effects of radiation on the ecosystem components.

FİZ340 Some Applications of Physics in Medical Science 2+0 3.0

Electromagnetic Spectrum; Interaction Between Light and Matter; X-Rays, Production and Properties of X-Rays; Medical Techniques Based on X-Rays; Physical Fundamentals of Rontgen Technique; Physical Principles of Computer-Based Tomography Technique; Radiation; Units of Radiation; Effective Dose Values Received due to Some X-Ray Based Medical Examinations; Physical Fundamentals and Advantages of Magnetic Resonance Imaging; Sound and Properties of Sound

Waves in Ultrasonography; Physical Fundamentals of Ultrasonography and Advantages; Other Applications of Physics in Medical Techniques.

FİZ341 Metrology I 2+0 3.0

Metrological Concepts; Institutions and Organizations Related to Metrology; Calibration and Indetermination; SI Units Concerned with Length (Length, Angle); Measurement Standards and Methods for Dimensional Measuring; Standards and Methods for Measuring Time and Frequency; SI Units of Electricity and Magnetism (Current, Voltage, Resistance, Inductance Capacitance, Electric Field and Magnetic Field and Their Flux Densities, Electrical Charge, Electrical Power and Energy, RF Power).

FİZ342 Metrology II 2+0 3.0

Definition of SI Units Used in Mass Measuring, Formation, Distribution, Measurement Standards and Measurement Methods; Definition of SI Units for Measurement of Mass and Units Derived from Mass and Formation, Measurement Standards and Methods; Definition of SI Units Used in Measuring Temperature and Moisture, Their Measurement, Measurement Standards; Methods for Photometric and Radiometric Measuring (Light Intensity, Light Flux, Brightness Level, Optical Power); Definition of SI Units Used in Measuring Acoustic, Ultrasonic and Vibration (Sound Pressure, Ultrasonic Power and Acceleration), Their Measurement Standards and Methods.

FİZ403 Spectroscopic Methods 2+0 3.0

Physical Properties of Matter and Electromagnetic Waves; Absorption Rules; Infrared Spectroscopy: IR absorption spectrophotometers, Analytical applications; Nuclear Magnetic Resonance Spectroscopy: Relaxation process, Chemical shift, NMR spectrometers, Analytical applications; Mass Spectroscopy: Ionization process, Fragmentation, Mass spectrometers; Uv-vis Absorption Spectroscopy: Uv-vis absorption spectrophotometers, Analytical applications

FİZ404 Physics Education 2+0 3.0

Necessity and Learning; Physiological necessities, Social and psychological necessities; Birth of Natural Sciences; Definition and Evolution of Natural Sciences; Scientific Knowledge: Scientific behaviors, skills; Scientific Method; Purpose of Scientific Teaching; Methods of Science Teaching: Learning behaviors; Functions of Natural Science Teachers; Preparing and Presentation of Curriculum of Natural Science.

FİZ413 Physical Foundation of Astronomy 2+0 3.0

Analysis of Light; Physical Models on Cosmology: Models from Copernicus models to Gravitation Laws of Newton, Towards Modern Cosmology; Cosmological Results of General and Special Relativity; Modern Cosmology; Birth of Universe and the Big Bang; Observational Evidences about the Big Bang; Universe Shape Definition by Using Observational Data; Sky view; The Solar System; The Sun, the Earth and the Moon.

FİZ414 Fundamantals of Astrophysics 2+0 3.0

Interstellar Matter: Gas Ambience of Interstellar Matter, Nebulae, Dark Nebulae; Galaxies: Novae, Spherical group, Classification of Galaxies, Galactic Investigation of the Milky Way System, Movement of Galaxies; Luminosity and Location of Stars: Evolution of Stars, Movement of Stars; Binary and Variable Stars: Two Body paradox, Visual Binary, Spectral Binary Stars, Cataclysmic Variables; Analysis based on Astrophysics: Heat and Colors of Stars, Formation and Structure of Stars, Progress of Stars, Death of Stars.

FİZ416 Environmental Physics 2+0 3.0

Environmental Pollution: Introduction, Sources of environmental pollution; Air Pollution: Introduction to pollutants, Particular pollutants, Impact of pollutants on environment, Physical and chemical methods used to control pollution; Noise: Introduction, Physical properties of noise, Size of noise and the character of noise, Impact of health and economy, Physical methods used in the control of noise; Radioactive Pollution: Introduction, Impact of radioactivity on living organisms, Storage of nuclear waste, Control of nuclear wastes and applications in the world.

FİZ421 Introduction to Plasma Physics 2+0 3.0

Plasma: Definition and examples of plasmas, Criteria for a plasma, Atomic and molecular structure; Single Particle Motion; Equation of motion in Electrical and Magnetic field, Guiding center, Adiabatic invariants; Collisions; Collisional cross section and frequency, Inelastic scattering, Elastic scattering, Distribution functions; Fluid Plasma Theory and Kinetic; Average velocity and energy, Liouvilles Theorem, Boltzmann equation, Two fluid model, Single fluid model, Diffusion.

FİZ422 Plasma and Fusion Energy 2+0 3.0

Fusion Reactions: Deuterium-deuterium reactions, Deuterium-tritium reactions, Reaction rates and products, Average reaction cross section, Fusion Power Generation; Power density, Lawson criterion, Energy balance and ignition temperature, Plasma Radiation Mechanisms; Bremsstrahlung radiation, Cyclotron radiation, Plasma Confinement; Magnetic Mirrors, Tokamak, Inertial.

FİZ425 High Energy Physics 2+0 3.0

Definition of High Energy Physics; Essential Particles; Structure of Matter; Different Properties in Different Dimensions; New Particles and Conservation Laws; Essential Forces: Interactions and their classifications, Tools of Particle Physics; Accelerators, Expansion of the Universe.

FİZ428 Nuclear Physics 4+0 6.0

Atomic Nucleus: Proton-electron model and neutron-proton model; Radioactivity: Laws of the radioactive decay, Units of radioactivity, The detectors of radiation; Nuclear Reactions: Conservation of energy in nuclear reactions, Nuclear reactions in a central mass co-ordinate system, Threshold energy in endothermic reactions, Cross-section effect, Average free way; Nuclear Masses: The scale of mass and isotropic mass formation, the mass appointment to benefit from the nuclear decay, Nucleus density, Package cross-section and binding energy; Nuclear Size: Scattering of alpha particle, Scattering of speedy neutron; Neutron Physics and Fission; Fusion and Nuclear Reactors.Atomic Nucleus: Proton-electron model and neutron-proton model; Radioactivity: Laws of the radioactive decay, Units of radioactivity, The detectors of radiation; Nuclear Reactions: Conservation of energy in nuclear reactions, Nuclear reactions in a central mass co-ordinate system, Threshold energy in endothermic reactions, Cross-section effect, Average free way; Nuclear Masses: The scale of mass and isotropic mass formation, the mass appointment to benefit from the nuclear decay, Nucleus density, Package cross-section and binding energy; Nuclear Size: Scattering of alpha particle, Scattering of speedy neutron; Neutron Physics and Fission; Fusion and Nuclear Reactors.

FİZ428 (Eng) Nuclear Physics 4+0 6.0

Atomic Nucleus: Proton-electron model and neutron-proton model; Radioactivity: Laws of the radioactive decay, Units of radioactivity, The detectors of radiation; Nuclear Reactions: Conservation of energy in nuclear reactions, Nuclear reactions in a central mass co-ordinate system, Threshold energy in endothermic reactions, Cross-section effect, Average free way; Nuclear Masses: The scale of mass and isotropic mass formation, the mass appointment to benefit from the nuclear decay, Nucleus density, Package cross-section and binding energy; Nuclear Size: Scattering of alpha particle, Scattering of speedy neutron; Neutron Physics and Fission; Fusion and Nuclear Reactors.Atomic Nucleus: Proton-electron model and neutron-proton model; Radioactivity: Laws of the radioactive decay, Units of radioactivity, The detectors of radiation; Nuclear Reactions: Conservation of energy in nuclear reactions, Nuclear reactions in a central mass co-ordinate system, Threshold energy in endothermic reactions, Cross-section effect, Average free way; Nuclear Masses: The scale of mass and isotropic mass formation, the mass appointment to benefit from the nuclear decay, Nucleus density, Package cross-section and binding energy; Nuclear Size: Scattering of alpha particle, Scattering of speedy neutron; Neutron Physics and Fission; Fusion and Nuclear Reactors.

FİZ429 Solid State Physics 4+0 6.0

Crystal Structure: Lattice vectors, Primitive cell, Simple crystal structures, Braggs's law, Reciprocal lattice; Crystal Binding; Crystal Vibrations and Thermal Properties; Free Electron Fermi Gas; Energy Bands; Semiconductors; Optical Processes; Superconductivity; Diamagnetism, Paramagnetism and Ferromagnetism; Nanostructures.Crystal Structure: Lattice vectors, Primitive cell, Simple crystal structures, Braggs's law, Reciprocal lattice; Crystal Binding; Crystal Vibrations and Thermal Properties; Free Electron Fermi Gas; Energy Bands; Semiconductors; Optical Processes; Superconductivity; Diamagnetism, Paramagnetism and Ferromagnetism; Nanostructures.

FİZ429 (Eng) Solid State Physics 4+0 6.0

Crystal Structure: Lattice vectors, Primitive cell, Simple crystal structures, Braggs's law, Reciprocal lattice; Crystal Binding; Crystal Vibrations and Thermal Properties; Free Electron Fermi Gas; Energy Bands; Semiconductors; Optical Processes; Superconductivity; Diamagnetism, Paramagnetism and Ferromagnetism; Nanostructures.Crystal Structure: Lattice vectors, Primitive cell, Simple crystal structures, Braggs's law, Reciprocal lattice; Crystal Binding; Crystal Vibrations and Thermal Properties; Free Electron Fermi Gas; Energy Bands; Semiconductors; Optical Processes; Superconductivity; Diamagnetism, Paramagnetism and Ferromagnetism; Nanostructures.

FİZ430 Laser Physics 2+0 3.0

The Nature of Light; The Wave Nature of Light; Polarization; Interference; Diffraction; Light Sources and Blackbody Radiation; A Review of Some Quantum Mechanical Concepts; Energy Bands in Solids; Conductors; Semiconductors and Insulators; Electrical Conductivity; P-N Junctions; Elliptical Polarizations; Birefringence; Optical Activity; The Acoustic-Optic Effect; Nonlinear Optics; Luminescence; Cathodoluminescence; The Cathode Ray Tube; Electro luminescence; The Light Emitting Diode; Emission and Absorption of Radiation; Optical Feedback; Laser Modes; Laser applications.

FİZ431 Physics Project I 2+4 7.0

Selection of a Special Topic in Physics; Review of Literature on the Selected Topic: Scanning Physical abstracts, Scanning periodicals and patents, Scanning textbooks through Internet, Scanning various international scientific indexes; Evaluations of the Information Obtained; Setting up a Study Schedule for the Project.Selection of a Special Topic in Physics; Review of Literature on the Selected Topic: Scanning Physical abstracts, Scanning periodicals and patents, Scanning textbooks

through Internet, Scanning various international scientific indexes; Evaluations of the Information Obtained; Setting up a Study Schedule for the Project.

FİZ431 (Eng) Physics Project I 2+4 7.0

Selection of a Special Topic in Physics; Review of Literature on the Selected Topic: Scanning Physical abstracts, Scanning periodicals and patents, Scanning textbooks through Internet, Scanning various international scientific indexes; Evaluations of the Information Obtained; Setting up a Study Schedule for the Project.Selection of a Special Topic in Physics; Review of Literature on the Selected Topic: Scanning Physical abstracts, Scanning periodicals and patents, Scanning textbooks through Internet, Scanning various international scientific indexes; Evaluations of the Information Obtained; Setting up a Study Schedule for the Project.

FİZ432 Physics Project II 2+4 7.0

Application of Experimental or Theoretical Studies in the Selected Subject of Research; Analysis and Interpretation of Obtained Experimental Data or Results of Theoretical Studies; Producing the Final Written Paper; Presentation of the Project.Application of Experimental or Theoretical Studies in the Selected Subject of Research; Analysis and Interpretation of Obtained Experimental Data or Results of Theoretical Studies; Producing the Final Written Paper; Presentation of the Project.

FİZ432 (Eng) Physics Project II 2+4 7.0

Application of Experimental or Theoretical Studies in the Selected Subject of Research; Analysis and Interpretation of Obtained Experimental Data or Results of Theoretical Studies; Producing the Final Written Paper; Presentation of the Project.Application of Experimental or Theoretical Studies in the Selected Subject of Research; Analysis and Interpretation of Obtained Experimental Data or Results of Theoretical Studies; Producing the Final Written Paper; Presentation of the Project.

FİZ433 Atom and Molecular Physics 4+0 6.0

The Central Field Problem and Hydrogen Atom: The wave mechanics of hydrogen atom, Solving the Schrödinger equation in spherical coordinates, Spherical harmonics, Depending of the radius of hydrogen atom wave equations, Parity of a function and parity operator, Energy in the solving hydrogen atom central field problem, The Virial theorem, Spin and Pauli spin matrices; Some Terms of Atomic Hamiltonian: Zeeman terms, Fine structure term, Hyperfine structure term, Stark term, The coupling of angular momentum in atom physics and electric dipole selection rules, Interactions between angular momentums of two particles; Molecular Structure: Binding energy of molecules, Ionic bond, Covalent bond, Van der Waals bond, Metalic bond.

FİZ434 Atomic Spectroscopy 2+0 3.0

Atomic Spectroscopy: Concept of Term Symbols in atomic spectroscopy, X-Ray spectroscopy of atoms, Electron configurations in atoms, Hund's rules, Periodic table, Helium spectra, Lamb shift in hydrogen atom; Time-independent Perturbation: Time-independent perturbation of non-degenerate and a steady level, Perturbation of degenerate and a steady level, Stark effect in hydrogen atom, Variation method; Time-dependent Perturbation: Transition probability, Harmonic perturbation, Electric dipole selection rules.

FİZ436 (Eng) Basics of Semiconductors 2+0 3.0

Introduction to Semiconductors: Basic properties of conductors, semiconductors and insulators, What is the difference between direct and indirect band gap?, Direct and indirect bandgap materials; Structural Differences Between Crystalline, Polycrystalline and Amorphous Materials; Growth Techniques for Semiconductors: Czochralski technique, Chemical vapor deposition technique, Molecular beam epitaxy technique, Physical vapor deposition technique, E-beam deposition technique, Sputtering technique; Characterization Techniques: Photoluminescence spectroscopy technique, Fourier transform infrared spectroscopy technique, Raman spectroscopy technique, I-V (current-voltage) and C-V (capacitance-voltage) techniques; Applications of Semiconductors: Pnp bipolar junction transistors, Npn bipolar junction transistors, N-channel metal oxide semiconductor field effect transistors, P-channel metal oxide semiconductor field effect transistors, Light emitting diodes, Solar cells; Fabrication Steps of Semiconductor Devices: Oxidation, Photolithography, Etching, Diffusion and doping with ion implantation, Metallization.

FİZ437 (Eng) Theory of Relativity I 2+0 3.0

Formulation of Special Theory of Relativity; Minkowski Spacetime; Lorentz Transformations; Covariant Formulation of Relativistic Mechanics; Relativistic Lagrangians; Equations of Motion From a Variational Principle; Dynamics of Relativistic Particles; Electromagnetic Fields.

FİZ438 (Eng) Theory of Relativity II 2+0 3.0

Principles of General Relativity; Metric Tensor; Connections; Torsion; Riemann Tensor, Ricci Tensor, Curvature Scalar; Motion of Particles in a Gravitational Field; The Field equations of General Relativity; Variational Principles in Gravitation

Theories; Energy-Momentum Tensor; Solutions of Einstein Field Equations; Schwarzschild Solution; Cosmological Solutions.

FİZ439 Observational Data Analysis in Astrophysic 2+0 3.0

Projection Definitions on Spherical Astronomy; Coordinate Systems; Constellations and Star Maps; Earth Based Data Acquisition Platforms; Orbital Base Data Acquisition Platforms; Principles of High Energy Data Acquisition; Principles of Optic Wavelength Data Acquisition; Principles of Radio Wavelength Data Acquisition; Telescope Types of Data Acquisition; CCD Cameras. Spectrographs; Data Types used on Astrophysical Data Analysis; Software of Astrophysical Data Analysis; Methods of Astrophysical Data Analysis on Different Wavelength.

FİZ440 Structural Analysis of Solids 2+0 3.0

Electromagnetic Spectrum; X-rays: Production of x-rays, Continuous spectrum, Characteristic spectrum; Crystal Structures: Crystal lattices, Bravais lattices, Crystal planes and directions, Miller indices; Determination of the Crystal Structure: Laue method, Rotating crystal method, Powder method; X-ray diffraction: Bragg's law, Same applications for the determination of the crystal structure.

FİZ441 Non-Associative Algebras and Physics 2+0 3.0

Algebra: History, Definition; Associative and Non-Associative Algebras; Division Algebras: Real numbers, Complex numbers, Quaternions, Octonions; Applications of Complex Numbers in Physics; Quaternion Algebra: Fundamental operations, Matrix representations, Applications in physics; Octonion Algebra: Fundamental operations, Multiplication rules for unit elements, Matrix representations, Complex octonions, Split octonions, Applications in physics; Hurwitz Theorem; Derivation of Lie Algebras.

FİZ442 Molecular Spectroscopy 2+0 3.0

Crystal Field Theory: Analysis of basic molecules by crystal field theory; Molecular Orbital Theory: Analysis of basic molecules by molecular orbital theory; Ligand Field Theory: Analysis of basic molecules by ligand field theory; Type of Electronic Radiation; Electronic Spectra: Electronic spectra of diatomic molecules, Electronic spectra of polyatomic molecules; Rotational and Vibrational Motions: Rotational spectra of diatomic molecules, Vibrational spectra of diatomic molecules, Rotational and vibrational spectra of diatomic molecules, Rotational spectra of polyatomic molecules, Vibrational spectra of polyatomic molecules.

FİZ443 Characterization Methods 2+0 3.0

X-Ray Diffraction (XRD): Properties of x-rays, Occurrence of x-rays, Bragg's law; Diffraction Methods; X-Ray Fluorescence (XRF): Wavelength dispersive x-ray fluorescence WDXRF, Energy dispersive x-ray fluorescence, EDXRF; Immersion Calorimetry: Calorimeter, Heat of immersion, Enthalpy of immersion,Himm, The factors affecting the occurrence of immersion heat; Thermal Analysis Methods: Thermogravimetric Analysis (TGA-DTG); Differential Thermal Analysis (DTA); Differential Scanning Calorimetric Analysis (DSC).

FİZ444 Satellite Data Analysis Techniques 2+0 3.0

Principles of Positional Modelling; Data Types; Topologic Data Analysis; Electromagnetic Spectrum; Doppler Effect; Global Positioning Systems; Solid Surface Sensing on Visual, Thermal, Near Infrared Fields; Mechanisms of Electromagnetic Wave-surface Interactions; Active and Passive Image Sensing Systems and Analysis; Satellites and Satellite Data Types; Image Bonification, Extraction, Merging, Rectification, Classification and Mapping Techniques.

FİZ446 Applied Heat Theory 0+2 3.0

Heat and Temperature: Heat and temperature concepts, Temperature and thermal equilibrium, Thermal expansion, Heat capacity and specific heat, Calculations related to heat energy, Experimental determination of the specific heat of copper, lead and glass; Heat Transfer Mechanisms: Thermal conductivity, Conduction, Convection, Radiation and absorption, The experimental determination of the thermal conductivity for various materials; Thermal Insulation: Thermal comfort, Measurement of thermal comfort, Reducing heat loss from buildings, Thermal insulation materials and their properties, Energy efficient building design.

FİZ448 X-Ray Diffraction Analysis Techniques 2+0 3.0

The nature and properties of the X-rays, Interaction with matter of X-rays, Indices in lattice plane, Point groups and crystal systems, Unit cell of the crystal, Miller and Miller-Bravais indices, X-ray diffractometer, Experimental diffractometer measurements, Crystalline structure determination of some semiconductors, Analysis of the structural parameters.

FİZ449 Structural and Vibrational Theory of Molecules 2+0 3.0

Classical and Quantum Mechanics Theory of Molecular Structure; Notions of Sterochemistry; Intermolecular Interactions: Dipole-Dipole interaction, The polarity of the molecules and the dipole moment, Hydrogen bond, Interactions between particles; Introduction to Vibrational Spectroscopy: Classical and quantum mechanical theory of molecular vibrations,

Theory of vibrational spectroscopy, Infrared spectroscopy, Raman spectroscopy; Vibration Spectroscopy Depends on the Molecular Structure; Matrix Isolation Technique.

FİZ452 Particle Physics 3+0 3.0

Relativistic Kinematics: Four-vectors, Collisions; Lifetimes and Cross Sections; Quantum Electrodynamics: Dirac equation, Bilinear covariants, Feynman rules; Structure of Hadrons: Quark-parton model, Björken scaling, Quark distribution functions; Quantum Chromodynamics: Feynman rules, Asymptotic freedom; Weak Interactions and Electroweak Unification; Physics of Massive Neutrinos.

FİZ454 (Eng) Nuclear Physics Laboratory 0+2 3.0

Detection of Radioactivity; Radioactive Decay and Half-Time; Attenuation of Alpha, Beta and Gamma Radiation; Demonstration of Alpha Particle Tracks; Rutherford Scattering; Alpha Spectroscopy; Determining the Energy Loss of Alpha Radiation in Air, Aluminium and Gold.

FRA175 (Fra) French I 3+0 3.0

Greeting and Introducing yourself; Saying the day and hour; Presenting somebody; Talking about occupations; Discovering the environment; Talking about the weather report; Informing oneself about health issues; Locating and Settling; Expressing ones opinion; Suggesting an activity; Expressing one's feelings; Reserving a train ticket; Communicating on the telephone; Talking about work; Expressing ones interest; The progress of an Action; Obtaining information about the press.

FRA176 (Fra) French II 3+0 3.0

Greeting and Introducing yourself; Saying the day and hour; Presenting somebody; Talking about occupations; Discovering the environment; Talking about the weather report; Informing oneself about health issues; Locating and Settling; Expressing one's opinion; Suggesting an activity; Expressing one's feelings; Reserving a train ticket; Communicating on the telephone; Talking about work; Expressing one's interest; The progress of an Action; Obtaining information about the press.

İKT107 Introduction to Economics I 4+0 6.0

Basic Concepts: Economic activity, Scope of economic science, Methods; Production Process; Production Factors; Productivity Laws; Business firms Types; Introduction to Price Theory: Value and utility, Behavior of the optimal consumer; Demand functions: Demand elasticity; Supply; Cost and Revenue Functions; Supply Curve: Supply and demand, Equilibrium price and its functions; Price Policy and Market Types: Equilibrium in perfect competition and price determination, Monopoly equilibrium; Price determination in imperfect competition; Rent; Wage; Interest; Entrepreneurial Income.Basic Concepts: Economic activity, Scope of economic science, Methods; Production Process; Production Factors; Productivity Laws; Business firms Types; Introduction to Price Theory: Value and utility, Behavior of the optimal consumer; Demand functions: Demand elasticity; Supply; Cost and Revenue Functions; Supply Curve: Supply and demand, Equilibrium price and its functions; Price Policy and Market Types: Equilibrium in perfect competition and price determination, Monopoly equilibrium; Price determination in imperfect competition; Rent; Wage; Interest; Entrepreneurial Income.

İKT108 Introduction to Economics II 4+0 6.0

National Income Accounting and National Income: Economic equilibrium, Macroeconomic relations, Nominal national income and reel income; Introduction to Monetary Theory: Value of money theories, Purchasing power, Loss of money value (inflation); International Economic Equilibrium (exchange rates); Basic Tools in Monetary Policy: Factors determining business cycles and national income; Introduction to Business Cycle Theories; Consumption Expenditures; Investment Expenditures; Employment; International Economic Relations; International Goods and Services; International Factor Movement; Economic Growth and Development.National Income Accounting and National Income: Economic equilibrium, Macroeconomic relations, Nominal national income and reel income; Introduction to Monetary Theory: Value of money theories, Purchasing power, Loss of money value (inflation); International Economic Equilibrium (exchange rates); Basic Tools in Monetary Policy: Factors determining business cycles and national income; Introduction to Business Cycle Theories; Consumption Expenditures; Investment Expenditures; Employment; International Economic Relations; International Goods and Services; International Factor Movement; Economic Growth and Development.

İKT151 Economics 3+0 3.0

Basic Economic Concepts; Production Process; Optimal Consumer Behavior; Demand; Supply; Equilibrium Price; Market Types; Determination of Factor Prices; National Product; Nominal and Real National Income; Introduction to Monetary Theory; Factors Determining Fluctuation and National Income: Consumption expenditures, Investment expenditures, Employment; International Economic Relations: International mobility of goods and services, International mobility of factors of production; Economic Growth and Development.Basic Economic Concepts; Production Process; Optimal Consumer Behavior; Demand; Supply; Equilibrium Price; Market Types; Determination of Factor Prices; National Product; Nominal and Real National Income; Introduction to Monetary Theory; Factors Determining Fluctuation and National Income: Consumption expenditures, Investment expenditures, Employment; International Economic Relations: International mobility of goods and services, International mobility of factors of production; Economic Growth and Development.

İKT151 (Eng) Economics 3+0 3.0

Basic Economic Concepts; Production Process; Optimal Consumer Behavior; Demand; Supply; Equilibrium Price; Market Types; Determination of Factor Prices; National Product; Nominal and Real National Income; Introduction to Monetary Theory; Factors Determining Fluctuation and National Income: Consumption expenditures, Investment expenditures, Employment; International Economic Relations: International mobility of goods and services, International mobility of factors of production; Economic Growth and Development.Basic Economic Concepts; Production Process; Optimal Consumer Behavior; Demand; Supply; Equilibrium Price; Market Types; Determination of Factor Prices; National Product; Nominal and Real National Income; Introduction to Monetary Theory; Factors Determining Fluctuation and National Income: Consumption expenditures, Investment expenditures, Employment; International Economic Relations: International mobility of goods and services, International mobility of factors of production; Economic Growth and Development.

İKT213 Mathematical Economics 3+0 4.5

Nature of Mathematical Economics: Economic models and analysis, Equilibrium analysis in economics; Comparative-Static Analysis of Equilibrium; Restricted and Unrestricted Optimization Problems: A special variety of equilibrium analysis, Dynamic analysis; Financial Mathematics; Compound Interest Rates and Installment Payment Nature of Mathematical Economics: Economic models and analysis, Equilibrium analysis in economics; Comparative-Static Analysis of Equilibrium; Restricted and Unrestricted Optimization Problems: A special variety of equilibrium analysis, Dynamic analysis; Financial Mathematics; Compound Interest Rates and Installment Payment

İKT309 Monetary Theory 3+0 5.0

Definition and Functions of Money; Interest Rates; Calculation of Interest Rates; Theories of Interest Rates; Loanable Funds Theory; Liquidity Preference Theory; Risk and Term Structure of Interest Rates: Yield curves and interpretation, Expectations hypothesis, Liquidity premium hypothesis, Segmented markets hypothesis; Theories of Demand for money: Classical quantity theory, Developments in Keynesian theory, Post Keynes; Transmission of money; General Equilibrium and Effectiveness of Monetary Policy.Definition and Functions of Money; Interest Rates; Calculation of Interest Rates; Theories of Interest Rates; Loanable Funds Theory; Liquidity Preference Theory; Risk and Term Structure of Interest Rates: Yield curves and interpretation, Expectations hypothesis, Liquidity premium hypothesis, Segmented markets hypothesis; Theories of Demand for money: Classical quantity theory, Developments in Keynesian theory, Post Keynes; Transmission of money; General Equilibrium and Effectiveness of Monetary Policy.

İKT310 Monetary Policy 3+0 5.0

Balance Sheet Analysis in Banking: Asset, Liquidity, Liability and capital management; Deposit Creation in Banking; Money Stock Determination: Monetary base, Money multiplier, Changes in money stock; Central Banking and Analysis of Central Bank balance sheet; Tools of Monetary Policy; Conduct of Monetary Policy: Choice of targets, Indicators of monetary policy; Monetary Policy Theory: Expectations and monetary policy, Activist and non-activist policy debate, Monetary policy rules and discretionary monetary policy; Monetary Policy Games.Balance Sheet Analysis in Banking: Asset, Liquidity, Liability and capital management; Deposit Creation in Banking; Money Stock Determination: Monetary base, Money multiplier, Changes in money stock; Central Banking and Analysis of Central Bank balance sheet; Tools of Monetary Policy; Conduct of Monetary Policy: Choice of targets, Indicators of monetary policy; Monetary Policy Theory: Expectations and monetary policy, Activist and non-activist policy debate, Monetary policy rules and discretionary monetary policy; Monetary Policy Games.

İKT322 International Economics 2+0 5.0

Globalization in World Economy; International Economic Integration; European Economic Community; North America Free Trade Areas; Association of Southeast Asian Nations; United Nations Conference on Trade and Development; International Economic Policies; Trade Restrictions; Dumping; Export Subsidies; Foreign Exchange Markets; Balance of Payments; International Monetary Systems; International Credit Markets; Third World Countries; International Monetary Fund and Turkey; International Investment Analysis.

İKT324 Financial Institutions and Banking 2+0 3.0

Definition and Functions of Financial Markets; Comprehensiveness and Elements of Financial Instruments; Structure and Functions of the Central Bank in Turkey and in the World; Commercial Banking Theory; Basic Functions of Commercial Banking in the World and Turkish Economy; Structure and Functions of Investment and Development Banking in Turkey; Stock exchange in the World and in Turkish Economy; Brokerage Houses in Turkey; Mutual Funds and Investment Corporations in Turkey; Islamic Banking in Turkey.

İKT382 Econometrics I 4+0 6.0

Definition and Scope of Econometrics; Econometric Research Method; Data and Variable Types in Econometric Analysis; Interpretation of Regression Model: Tests, Criteria, Variable selection, Transformations; Measurement of Elasticity; Functional Forms of Regression Models: Regression through the origin, Log-linear model, Semilog models, Reciprocal

models; Heteroscedasticity: Tests for heteroscedasticity, Generalized least squares; Autocorrelation: Tests for autocorrelation; Non-Normality; Test for Non-normality: Tests and estimators; Model Specification Errors.

İKT382 (Eng) Econometrics I 4+0 6.0

Definition and Scope of Econometrics; Econometric Research Method; Data and Variable Types in Econometric Analysis; Interpretation of Regression Model: Tests, Criteria, Variable selection, Transformations; Measurement of Elasticity; Functional Forms of Regression Models: Regression through the origin, Log-linear model, Semilog models, Reciprocal models; Heteroscedasticity: Tests for heteroscedasticity, Generalized least squares; Autocorrelation: Tests for autocorrelation; Non-Normality; Test for Non-normality: Tests and estimators; Model Specification Errors.

İKT417 Financial Economics I 2+0 3.0

Significance of Financial Markets in Economy; Financial Flow Table of an Economy and its Relation to Real Economic Variables; Fund Management; Demand and Supply of Securities; Security Markets and their Efficiency; Effective Market Hypothesis; Introduction to Determination of Security Prices; Options and Option Pricing; Future Contracts; Future Markets and Future Pricing; Swap Transactions and Swap Pricing.Significance of Financial Markets in Economy; Financial Flow Table of an Economy and its Relation to Real Economic Variables; Fund Management; Demand and Supply of Securities; Security Markets and their Efficiency; Effective Market Hypothesis; Introduction to Determination of Security Prices; Options and Option Pricing; Future Contracts; Future Markets and Future Pricing; Swap Transactions and Swap Pricing.

İKT418 Financial Economics II 2+0 3.0

Capital Markets; Institutions and Instruments on Capital Markets; Analysis of Bond Markets: Determination of bond quality, Bond valuation, Relationship between term and yield of bonds, Duration approach to bond valuation, Management of bond portfolios; Fundamental Analysis Approach to Stock Valuation; Technical Analysis of Stock Market: Dow Theory, Price-Quantity indicators, Approaches to price analysis; Portfolio Management; Evaluation of Portfolio Performance; Market Indicators and Data Sources.Capital Markets; Institutions and Instruments on Capital Markets; Analysis of Bond Markets: Determination of bond quality, Bond valuation, Relationship between term and yield of bonds, Duration approach to bond valuation, Management of bond portfolios; Fundamental Analysis Approach to Stock Valuation; Technical Analysis of Stock Market: Dow Theory, Price-Quantity indicators, Approaches to price analysis; Portfolio Management; Evaluation of Portfolio Performance; Market Indicators and Data Sources.

İKT421 Economy of Turkey 2+0 3.0

The Place of Turkish Economy in World Economy; National Income and Income Distribution in Turkey; Developments of Public Finance in Turkey; Government Debt in Turkey; Sectoral Developments in Turkey: Agriculture, Industry, Energy, Service; Inflation in Turkey; Structural Stability Policies in Turkish Economy; A General Evaluation of International Trade Policies; Relations with EU; Policies Concerning Foreign Capital.

İKT460 Financial Econometrics 3+0 4.5

Fundamental concepts of financial econometrics; Introduction to theory of statistics and linear regression analysis; Single and multifactor index models; Capital Asset Pricing Model (CAPM); Arbitrage Pricing Model (APM); Modeling and estimation of financial time series; Predicting stock returns; autoregressive conditional heteroscedasticity models (ARCH); Financial risk models; Value at Risk (VaR); Portfolio theory.

İKT482 Econometrics II 4+0 6.0

Introduction to Econometrics; Dummy Variables; Regression with Dummy Independent Variables; Comparing Two Regression Models: Dummy variable approach, Chow test; Regression with Dummy Dependent Variable: Linear probability model, Logit model; Probit model; Dynamic Econometric Models; Reasons for Lags; Autoregressive models; Distributed-Lag Models; Panel Data; Econometric Models for Panel Data; Applications.

İLT408 Effective and Pleasant Speaking Techniques 2+0 2.5

Introduction to Voice: Basic breath control and tone production to develop strength, Control, Flexibility, Awareness; Speech Techniques; Pronunciation, Tonality, Intonation, Emotion; Dictation; Exercises on Monologues, Poems; Body Language Exercises.

İNG187 (Eng) English I 3+0 3.0

Using Personal Pronouns and Possessive Adjectives; Using to be in Present Tense; Using Singular and Plural Nouns; Using Basic Language Related to Food and Drink; Using "There is-there are" in sentences; Using "have got"; Asking "yes-no" Questions and Giving Short Answers to Them; Talking about Daily and Weekly Routines; Talking about Likes and Dislikes; Talking about Sports and Hobbies; Talking about Abilities by Using "can", "can't"; Using Adjectives that Describe People; Talking about Appearance, Personality and Feelings of People; Talking about Clothes and Colours; Talking about Shopping and Prices; Using Present Continuous Tense.

İNG188 (Eng) English II 3+0 3.0

Using Simple Present Tense; Comparing Simple Present and Present Continuous Tenses; Using Prepositions of Time and Place; Giving Directions, Making Reservations; Using "to be" in Past Tense; Using Regular and Irregular Verbs in Simple Past Tense; Using Comparative and Superlative Form of Adjectives; Using Modals to Give Advice; Suggestions and Obligations; Using Future Tense: Making Sentences Using "going to" and "will"; Using If Clauses Type 0 and 1.

İNG225 (Eng) Academic English I 3+0 3.0

Reading Skills for Academic Study: Understanding key vocabulary, Getting the gist of the text, Skimming and scanning, Understanding text organization, Developing basic vocabulary knowledge; Listening Skills for Academic Study: Listening for main idea, Listening for detailed information, Listening to short daily conversations, Listening for key ideas; Speaking Skills for Academic Study: Introducing oneself, Maintaining everyday conversations, Giving descriptions of events, Asking and answering questions; Writing Skills for Academic Study: Writing simple sentences, Writing notes, Writing basic descriptions of events, Writing informal letters.

İNG226 (Eng) Academic English II 3+0 3.0

Reading Skills for Academic Study: Exposure to simple academic texts, Developing reading fluency, Identifying text type, Improving academic vocabulary knowledge, Distinguishing key ideas from supporting details; Listening Skills for Academic Study: Distinguishing main idea from the detailed information, Listening to short texts on different topics, Noticing intonation; Speaking Skills for Academic Study: Asking for information, Giving detailed information on relevant topics, Asking for and giving directions; Writing Skills for Academic Study: Writing simple and compound sentences, Writing simple biographies, Writing brief reports, Writing short paragraphs.

İNG325 (Eng) Academic English III 3+0 3.0

Reading Skills for Academic Study: Developing reading fluency, Adapting reading style to different text types, Practicing critical reading skills; Listening Skills for Academic Study: Listening to longer texts, Listening to short authentic texts, Recognizing stress and intonation; Speaking Skills for Academic Study: Asking for clarification, Asking for confirmation, Giving reasons and explanations, Giving short presentations on familiar topics; Writing Skills for Academic Study: Identifying different styles of paragraphs, Paraphrasing ideas in short texts, writing academic paragraphs, Writing formal and informal academic texts, Writing summaries.

İNG326 (Eng) Academic English IV 3+0 3.0

Reading Skills for Academic Study: Adjusting speed and reading style to different genres and tasks, Reviewing and analyzing material, Focusing on critical reading skills, Recognizing biases in written works; Listening skills for academic study: Listening to longer authentic texts, Taking notes, Distinguishing facts from opinions, Drawing inferences; Speaking Skills for Academic Study: Participating in group discussions, Expanding opinions, Giving longer presentations on familiar topics; Writing skills for academic study: Expressing opinions in well-organized academic essays, paraphrasing ideas in texts, writing summaries of longer texts.

İNG361 (Eng) English for Specific Purposes I 2+0 4.0

Length; International System of Measurement; Cycles in Environment; Function of Stomata; Green Algae; Proteins; Air Pollution; Cytoplasmic Organelles: Mitochondri, Endoplasmic reticulum, Ribosomes, Golgi apparatus, Vocuoles, Lysosomes, Microfilaments, Microtubules; Symbiotic Relationships: Symbiosis, Mutualism, Commensalism, Parasitism; Nucleic Acids; The Structure of DNA; The Cell Theory; What is Mitosis?; What are Viruses?; Amoeba: A simple protozoan; Mutations; Acid Rain.Length; International System of Measurement; Cycles in Environment; Function of Stomata; Green Algae; Proteins; Air Pollution; Cytoplasmic Organelles: Mitochondri, Endoplasmic reticulum, Ribosomes, Golgi apparatus, Vocuoles, Lysosomes, Microfilaments, Microtubules; Symbiotic Relationships: Symbiosis, Mutualism, Commensalisms, Parasitism; Nucleic Acids; The Structure of DNA; The Cell Theory; What is Mitosis?; What are Viruses?; Amoeba: A simple protozoan; Mutations; Acid Rain.

İNG362 (Eng) English for Specific Purposes II 2+0 4.0

Cell chemistry; Comparisons of the Prokaryotic and Eucaryotic Cells; Microbial Nutrition: Culture media; Microbial Growth; Laboratory Culture of Microorganisms; Sterilization and Aseptic Techniques: Heat sterilization, Radiation sterilization, Filter sterilization, Chemical growth control, Antibiotics, Antibiotic resistance; Procedures for Isolating Microorganisms from Nature; Metabolic Diversity Among Microorganisms; Microbial Ecology.

İNG425 (Eng) Academic English V 3+0 3.0

Reading Skills for Academic Study: Analyzing texts, Drawing conclusions and identifying implied meaning, Developing the vocabulary in the field of study; Listening Skills for Academic Study: Drawing inferences from the theme, Taking notes during a lecture, Interpreting what is heard, Following lectures on familiar topics; Speaking Skills for Academic Study: Participating in discussions, Summarizing, Interviewing, Applying turn-taking rules, Giving presentations on a variety of topics, Commenting on classmates presentations; Writing Skills for Academic Study: Writing various forms of academic writing, Building effective arguments using evidence.

İNG426 (Eng) Academic English VI **3+0 3.0**

Reading Skills for Academic Study: Drawing conclusions based on the information in the text, Comparing and contrasting main ideas, Summarizing extracts from various sources, Evaluating information; Listening Skills for Academic Study: Following lectures, Synthesizing, Evaluating and transferring what was heard; Speaking Skills for Academic Study: Participating in discussions, Justifying point of view, Using strategies to achieve comprehension, Carrying out interviews, Summarizing discussions, Giving longer presentations on academic topics; Writing Skills for Academic Study: Writing well-researched essays and reports, Writing commentaries.

İST109 Document Preparation in Computer **3+0 3.5**

Word Processing Application: File operations, Text operations, Formatting operations, Page layout and printing, Table operations, Drawing tools and objects; Electronic Spreadsheet Application: File operations, Working with cells, Formatting operations, Worksheet settings and printing options, Adding operations, Formulas; Presentation Application: File operations, Text operations, Object operations, Slide format and printing options, Slide design, Adding animations.Word Processing Application: File operations, Text operations, Formatting operations, Page layout and printing, Table operations, Drawing tools and objects; Electronic Spreadsheet Application: File operations, Working with cells, Formatting operations, Worksheet settings and printing options, Adding operations, Formulas; Presentation Application: File operations, Text operations, Object operations, Slide format and printing options, Slide design, Adding animations.

İST109 (Eng) Document Preparation in Computer **3+0 3.5**

Word Processing Application: File operations, Text operations, Formatting operations, Page layout and printing, Table operations, Drawing tools and objects; Electronic Spreadsheet Application: File operations, Working with cells, Formatting operations, Worksheet settings and printing options, Adding operations, Formulas; Presentation Application: File operations, Text operations, Object operations, Slide format and printing options, Slide design, Adding animations.Word Processing Application: File operations, Text operations, Formatting operations, Page layout and printing, Table operations, Drawing tools and objects; Electronic Spreadsheet Application: File operations, Working with cells, Formatting operations, Worksheet settings and printing options, Adding operations, Formulas; Presentation Application: File operations, Text operations, Object operations, Slide format and printing options, Slide design, Adding animations.

İST117 Fundamental Statistics I **4+0 6.0**

Statistics: Meaning, History, General application areas; Averages: Mean, Geometric mean, Harmonic mean, Quadratic mean, Mode, Median, Quantiles; Variability: Variance, Standard deviation, Variation coefficient; Probability Distributions for Discrete Data: Binomial, Poisson; Probability Distributions for Continuous Data: Gauss distribution, Symmetry, Asymmetry, Kurtosis, Skewness, Moments.Statistics: Meaning, History, General application areas; Averages: Mean, Geometric mean, Harmonic mean, Quadratic mean, Mode, Median, Quantiles; Variability: Variance, Standard deviation, Variation coefficient; Probability Distributions for Discrete Data: Binomial, Poisson; Probability Distributions for Continuous Data: Gauss distribution, Symmetry, Asymmetry, Kurtosis, Skewness, Moments.

İST117 (Eng) Fundamental Statistics I **4+0 6.0**

Statistics: Meaning, History, General application areas; Averages: Mean, Geometric mean, Harmonic mean, Quadratic mean, Mode, Median, Quantiles; Variability: Variance, Standard deviation, Variation coefficient; Probability Distributions for Discrete Data: Binomial, Poisson; Probability Distributions for Continuous Data: Gauss distribution, Symmetry, Asymmetry, Kurtosis, Skewness, Moments.Statistics: Meaning, History, General application areas; Averages: Mean, Geometric mean, Harmonic mean, Quadratic mean, Mode, Median, Quantiles; Variability: Variance, Standard deviation, Variation coefficient; Probability Distributions for Discrete Data: Binomial, Poisson; Probability Distributions for Continuous Data: Gauss distribution, Symmetry, Asymmetry, Kurtosis, Skewness, Moments.

İST118 Fundamental Statistics II **4+0 6.0**

Introduction to Sampling; Sampling Distributions: Sampling distributions for mean, Ratios, and Difference; Sampling Error: Standard error; Statistical Inference: Point and interval estimation; Statistical Decision Theory: Hypothesis testing, Parametric and non-parametric approaches, Hypothesis testing for big samples, Hypothesis testing for small samples; Chi-square Distribution: Chi-square tests: Simple Linear Regression and Correlation Techniques; İndexesIntroduction to Sampling; Sampling Distributions: Sampling distributions for mean, Ratios, and Difference; Sampling Error: Standard error; Statistical Inference: Point and interval estimation; Statistical Decision Theory: Hypothesis testing, Parametric and non-parametricapproaches, Hypoth esis testing for big samples, Hypothesis testing for small samples; Chi-square Distribution: Chi-square tests: Simple Linear Regression and Correlation Techniques; İndexes

İST118 (Eng) Fundamental Statistics II **4+0 6.0**

Introduction to Sampling; Sampling Distributions: Sampling distributions for mean, Ratios, and Difference; Sampling Error: Standard error; Statistical Inference: Point and interval estimation; Statistical Decision Theory: Hypothesis testing, Parametric and non-parametric approaches, Hypothesis testing for big samples, Hypothesis testing for small samples; Chi-square Distribution: Chi-square tests: Simple Linear Regression and Correlation Techniques; İndexesIntroduction to Sampling; Sampling Distributions: Sampling distributions for mean, Ratios, and Difference; Sampling Error: Standard error; Statistical Inference: Point and interval estimation; Statistical Decision Theory: Hypothesis testing, Parametric and non-

parametricapproaches, Hypoth esis testing for big samples, Hypothesis testing for small samples; Chi-square Distribution: Chi-square tests: Simple Linear Regression and Correlation Techniques; İndexes

İST126 Probability II 4+0 6.0

Some Continuous Distributions: Uniform, Exponential, Gamma, Beta, Normal, Log-normal, Cauchy, Laplace and Weibull distributions; Families of Distributions: Location-scale families; Distribution of Function of Random Variable; Random Vectors: Distributions of random vectors, Joint probability function and joint probability density function; Marginal and Conditional Distributions; Covariance and Correlation Coefficient; Independent Random Variables; The Law of Large Numbers; The Central Limit Theorem.Some Continuous Distributions: Uniform, Exponential, Gamma, Beta, Normal, Log-normal, Cauchy, Laplace and Weibull distributions; Families of Distributions: Location-scale families; Distribution of Function of Random Variable; Random Vectors: Distributions of random vectors, Joint probability function and joint probability density function; Marginal and Conditional Distributions; Covariance and Correlation Coefficient; Independent Random Variables; The Law of Large Numbers; The Central Limit Theorem.

İST126 (Eng) Probability II 4+0 6.0

Some Continuous Distributions: Uniform, Exponential, Gamma, Beta, Normal, Log-normal, Cauchy, Laplace and Weibull distributions; Families of Distributions: Location-scale families; Distribution of Function of Random Variable; Random Vectors: Distributions of random vectors, Joint probability function and joint probability density function; Marginal and Conditional Distributions; Covariance and Correlation Coefficient; Independent Random Variables; The Law of Large Numbers; The Central Limit Theorem.Some Continuous Distributions: Uniform, Exponential, Gamma, Beta, Normal, Log-normal, Cauchy, Laplace and Weibull distributions; Families of Distributions: Location-scale families; Distribution of Function of Random Variable; Random Vectors: Distributions of random vectors, Joint probability function and joint probability density function; Marginal and Conditional Distributions; Covariance and Correlation Coefficient; Independent Random Variables; The Law of Large Numbers; The Central Limit Theorem.

İST201 Statistics 3+0 3.0

Definition of Statistics: Data collection; Data Presentation Techniques, Distribution theory; Sampling: Errors, Estimation of population parameters; Hypothesis Testing: Hypothesis testing for two populations, Comparisons of ratios, Hypothesis testing for large and small samples; The Chi-Square Distribution and Chi-Square Testing; Correlation: Simple linear correlation coefficient, Regression coefficient, Forecasting, Determination coefficient.Definition of Statistics: Data collection; Data Presentation Techniques, Distribution theory; Sampling: Errors, Estimation of population parameters; Hypothesis Testing: Hypothesis testing for two populations, Comparisons of ratios, Hypothesis testing for large and small samples; The Chi-Square Distribution and Chi-Square Testing; Correlation: Simple linear correlation coefficient, Regression coefficient, Forecasting, Determination coefficient.

İST209 Biostatistics 3+0 2.5

Biostatistical Sciences and Statistical Relations; Importance of Statistics in Health Sciences; Basic Terminology of Statistics; Techniques for Data Collection; Preparation and Presentation of Data; Sampling: Sampling distributions; Point and interval estimations for population parameters; Distributions: Chi-square distribution; Hypothesis tests; Z distribution; T distribution; Calculation of Correlation and Regression Coefficients and Their Interpretations; Nonparametric Tests.

İST213 Probability 3+0 3.0

Permutation, Combination; Binomial Theorem; Definitions of Probability, Axiomatic Probability; Conditional Probability and Independent Events; Bayes? Theorem; Concept of Random Variable; Univariate Probability Distributions; Expected Value and Variance; Conditional Probability Distributions; Transformation; Probability Generating Function, Characteristic Function, Moment Generating Function; Some Special Discrete and Continuous Probability Distributions; Bivariate Probability Distributions.Permutation, Combination; Binomial Theorem; Definitions of Probability, Axiomatic Probability; Conditional Probability and Independent Events; Bayes? Theorem; Concept of Random Variable; Univariate Probability Distributions; Expected Value and Variance; Conditional Probability Distributions; Transformation; Probability Generating Function, Characteristic Function, Moment Generating Function; Some Special Discrete and Continuous Probability Distributions; Bivariate Probability Distributions.

İST228 Advanced Operation Research 3+0 4.5

Fundamental Concepts and Properties of Nonlinear Programming; Convexity and Concavity; Analytical and Numerical Solutions for Non-linear Models with Single and Multiple Variables; Kuhn-Tucker Conditions; Integer Programming; Capital Budgeting; Loading Problem; Warehouse Selection Problem; Distribution Problem; Traveling Salesman Problem; Use of Integer Variable in Model Development; Solution Approaches in Integer Programming: Branch and bound technique; Solution of 0-1 Linear-Integer Model; Dynamic Programming; Multi-level Decision Problems; Finite Level Number Problems; Decision-making under Risk and Uncertainty; Game theories; Decision-making under conflict.

İST235 Linear Algebra I 4+0 5.0

Systems of linear equations and its matrix representation; Row equivalent systems, echelon and reduced echelon forms of matrix, Gaussian and Gauss-Jordan eliminations; Matrix algebra and algebraic rules; Elementary matrices, its property;

Gauss-Jordan method for computing inverse matrix; LU factorization of matrix; Determinants and its properties; The adjoint of a matrix; Cramer's rule; Vector spaces: Definition and examples; Subspaces, the null space of a matrix, span; Basis and dimension of vector space, change of basis; Row space and column space of matrix, the rank of a matrix; Consistency theorem for linear systems; Eigen values and eigenvectors, characteristic equation, eigen space; Diagonalization; Symmetric, skew-symmetric, orthogonal matrices, its eigen values and eigenvectors; Quadratic forms, positive definite matrices; Principal axes theorem.

İST236 Linear Algebra II 4+0 5.0

Linear transformations and its matrix representations, properties; Similarity transformations; Orthogonality, orthogonal subspaces; Least squares problems; Inner product spaces and its properties; Orthonormal sets; The Gram-Schmidt orthogonalization process; QR factorization; Hermitian and Unitary matrices, Schur's theorem; The SVD decomposition of matrix; Lu decomposition; Orthogonal transformations: Householder transformations; Rotations and reflections, Givens transformations; Reduction to Hessenberg form, the power method; QR algorithm and some applications.

İST239 Probability I 4+0 6.0

Sets and Classes; Sigma Algebra, Borel Algebra; Random experiment, sample space and event; Probability Measures and Probability Spaces; Conditional Probability, Bayes theorem and independent events; Random variables and distribution functions; Discrete random variables and continuous random variables; Expected values: Mean, variance, moments, moment generating functions; Mode, median, skewness and kurtosis coefficients; Inequalities: Chebyshev, Cauchy-Schwarz and Jensen inequalities; Some discrete distributions: Uniform, Bernoulli, binomial, multinomial, geometric, negative binomial, hypergeometric and Poisson distributions.Sets and Classes; Sigma Algebra, Borel Algebra; Random experiment, sample space and event; Probability Measures and Probability Spaces; Conditional Probability, Bayes theorem and independent events; Random variables and distribution functions; Discrete random variables and continuous random variables; Expected values: Mean, variance, moments, moment generating functions; Mode, median, skewness and kurtosis coefficients; Inequalities: Chebyshev, Cauchy-Schwarz and Jensen inequalities; Some discrete distributions: Uniform, Bernoulli, binomial, multinomial, geometric, negative binomial, hypergeometric and Poisson distributions.

İST239 (Eng) Probability I 4+0 6.0

Sets and Classes; Sigma Algebra, Borel Algebra; Random experiment, sample space and event; Probability Measures and Probability Spaces; Conditional Probability, Bayes theorem and independent events; Random variables and distribution functions; Discrete random variables and continuous random variables; Expected values: Mean, variance, moments, moment generating functions; Mode, median, skewness and kurtosis coefficients; Inequalities: Chebyshev, Cauchy-Schwarz and Jensen inequalities; Some discrete distributions: Uniform, Bernoulli, binomial, multinomial, geometric, negative binomial, hypergeometric and Poisson distributions.Sets and Classes; Sigma Algebra, Borel Algebra; Random experiment, sample space and event; Probability Measures and Probability Spaces; Conditional Probability, Bayes theorem and independent events; Random variables and distribution functions; Discrete random variables and continuous random variables; Expected values: Mean, variance, moments, moment generating functions; Mode, median, skewness and kurtosis coefficients; Inequalities: Chebyshev, Cauchy-Schwarz and Jensen inequalities; Some discrete distributions: Uniform, Bernoulli, binomial, multinomial, geometric, negative binomial, hypergeometric and Poisson distributions.

İST243 Exploratory Data Analysis 2+0 3.0

Basic Concepts: Statistics, Data, Collecting and Summarizing Data, Exploratory Data Analysis; Graphic Displays: Dot Diagram, Stem-and-Leaf Display, Bar Graph, Histogram and Bihistogram, Box-and-Whisker Plot, Q-Q Plot, Mean and Standard Deviation Plots, Matrix Drawing, Star Plots, Chernoff Faces, Andrews Chart and Other Graphical Techniques; Measures of Central Tendency and Dispersion; Median Polish: Introduction, Case, Graphical Display.Basic Concepts: Statistics, Data, Collecting and Summarizing Data, Exploratory Data Analysis; Graphic Displays: Dot Diagram, Stem-and-Leaf Display, Bar Graph, Histogram and Bihistogram, Box-and-Whisker Plot, Q-Q Plot, Mean and Standard Deviation Plots, Matrix Drawing, Star Plots, Chernoff Faces, Andrews Chart and Other Graphical Techniques; Measures of Central Tendency and Dispersion; Median Polish: Introduction, Case, Graphical Display.

İST243 (Eng) Exploratory Data Analysis 2+0 3.0

Basic Concepts: Statistics, Data, Collecting and Summarizing Data, Exploratory Data Analysis; Graphic Displays: Dot Diagram, Stem-and-Leaf Display, Bar Graph, Histogram and Bihistogram, Box-and-Whisker Plot, Q-Q Plot, Mean and Standard Deviation Plots, Matrix Drawing, Star Plots, Chernoff Faces, Andrews Chart and Other Graphical Techniques; Measures of Central Tendency and Dispersion; Median Polish: Introduction, Case, Graphical Display.Basic Concepts: Statistics, Data, Collecting and Summarizing Data, Exploratory Data Analysis; Graphic Displays: Dot Diagram, Stem-and-Leaf Display, Bar Graph, Histogram and Bihistogram, Box-and-Whisker Plot, Q-Q Plot, Mean and Standard Deviation Plots, Matrix Drawing, Star Plots, Chernoff Faces, Andrews Chart and Other Graphical Techniques; Measures of Central Tendency and Dispersion; Median Polish: Introduction, Case, Graphical Display.

İST247 Mathematical Statistics I 4+0 7.0

Vector of Random Variables and Distributions of Random Vectors: Marginal and conditional distributions, Conditional expected value and variance; Bivariate Normal Distribution and Properties; Distributions of Functions of Random Variables: Distribution function technique, Transformation technique, Moment generating technique; Chi-Square, Student t and F

Distributions; Concepts of Population, Parameter and Estimator; Sampling Distributions; Convergences: Convergence in probability, Convergence in distribution (Central limit theorem), Convergence almost surely; Order Statistics and Some Related Sample Statistics.Vector of Random Variables and Distributions of Random Vectors: Marginal and conditional distributions, Conditional expected value and variance; Bivariate Normal Distribution and Properties; Distributions of Functions of Random Variables: Distribution function technique, Transformation technique, Moment generating technique; Chi-Square, Student t and F Distributions; Concepts of Population, Parameter and Estimator; Sampling Distributions; Convergences: Convergence in probability, Convergence in distribution (Central limit theorem), Convergence almost surely; Order Statistics and Some Related Sample Statistics.

İST247 (Eng) Mathematical Statistics I 4+0 7.0

Vector of Random Variables and Distributions of Random Vectors: Marginal and conditional distributions, Conditional expected value and variance; Bivariate Normal Distribution and Properties; Distributions of Functions of Random Variables: Distribution function technique, Transformation technique, Moment generating technique; Chi-Square, Student t and F Distributions; Concepts of Population, Parameter and Estimator; Sampling Distributions; Convergences: Convergence in probability, Convergence in distribution (Central limit theorem), Convergence almost surely; Order Statistics and Some Related Sample Statistics.Vector of Random Variables and Distributions of Random Vectors: Marginal and conditional distributions, Conditional expected value and variance; Bivariate Normal Distribution and Properties; Distributions of Functions of Random Variables: Distribution function technique, Transformation technique, Moment generating technique; Chi-Square, Student t and F Distributions; Concepts of Population, Parameter and Estimator; Sampling Distributions; Convergences: Convergence in probability, Convergence in distribution (Central limit theorem), Convergence almost surely; Order Statistics and Some Related Sample Statistics.

İST248 Mathematical Statistics II 4+0 7.0

Introduction to Parameter Estimation; Properties of Estimators: Unbiasedness, Sufficiency, Consistency, Efficiency and Completeness; Methods of Finding Estimators: Moment estimators, Maximum likelihood estimators, Least squares estimators; Minimum-Variance Unbiased Estimators: Cramer-Rao inequality, Rao-Blackwell theorem, Lehmann-Scheffe uniqueness theorem; Introduction to Hypothesis Testing: Simple and composite hypothesis; Test Function, Error Probabilities and Power Function; Most Powerful Tests: Neyman-Pearson lemma, Karlin-Rubin theorem; Likelihood Ratio Tests; Interval Estimators.Introduction to Parameter Estimation; Properties of Estimators: Unbiasedness, Sufficiency, Consistency, Efficiency and Completeness; Methods of Finding Estimators: Moment estimators, Maximum likelihood estimators, Least squares estimators; Minimum-Variance Unbiased Estimators: Cramer-Rao inequality, Rao-Blackwell theorem, Lehmann-Scheffe uniqueness theorem; Introduction to Hypothesis Testing: Simple and composite hypothesis; Test Function, Error Probabilities and Power Function; Most Powerful Tests: Neyman-Pearson lemma, Karlin-Rubin theorem; Likelihood Ratio Tests; Interval Estimators.

İST248 (Eng) Mathematical Statistics II 4+0 7.0

Introduction to Parameter Estimation; Properties of Estimators: Unbiasedness, Sufficiency, Consistency, Efficiency and Completeness; Methods of Finding Estimators: Moment estimators, Maximum likelihood estimators, Least squares estimators; Minimum-Variance Unbiased Estimators: Cramer-Rao inequality, Rao-Blackwell theorem, Lehmann-Scheffe uniqueness theorem; Introduction to Hypothesis Testing: Simple and composite hypothesis; Test Function, Error Probabilities and Power Function; Most Powerful Tests: Neyman-Pearson lemma, Karlin-Rubin theorem; Likelihood Ratio Tests; Interval Estimators.Introduction to Parameter Estimation; Properties of Estimators: Unbiasedness, Sufficiency, Consistency, Efficiency and Completeness; Methods of Finding Estimators: Moment estimators, Maximum likelihood estimators, Least squares estimators; Minimum-Variance Unbiased Estimators: Cramer-Rao inequality, Rao-Blackwell theorem, Lehmann-Scheffe uniqueness theorem; Introduction to Hypothesis Testing: Simple and composite hypothesis; Test Function, Error Probabilities and Power Function; Most Powerful Tests: Neyman-Pearson lemma, Karlin-Rubin theorem; Likelihood Ratio Tests; Interval Estimators.

İST249 Programing with Matlab 4+0 5.0

Introduction to MATLAB Programming: Variables, Data types; Data Processing, Reading and Writing in MATLAB; Fundamental MATLAB Operations and Functions; Program Control Commands: Conditional control, Loop control; Matrix and Vector Operations with MATLAB; Function Operations; Function Definition and Using with M-Files; Symbolic Programming: Limit, Derivative, Integral; Drawing of Two and Three Dimensional Graphics with MATLAB; Program Examples with MATLAB for Statistical Applications.

İST249 (Eng) Programing with Matlab 4+0 5.0

Introduction to MATLAB Programming: Variables, Data types; Data Processing, Reading and Writing in MATLAB; Fundamental MATLAB Operations and Functions; Program Control Commands: Conditional control, Loop control; Matrix and Vector Operations with MATLAB; Function Operations; Function Definition and Using with M-Files; Symbolic Programming: Limit, Derivative, Integral; Drawing of Two and Three Dimensional Graphics with MATLAB; Program Examples with MATLAB for Statistical Applications.

İST256 (Eng) Introduction to R Programming 3+0 4.5

Basic Data Structures; Data Import and Export: Data inspection and manipulation; Comparisons of Observed Group Means: T-tests; Add-on Packages: How to find, install, and work; How/where to obtain; Basic Programming Structures: Loops, If-else statements; Built-in Functions; Apply Family; R Graphics and Visualization: Base graphic system; Trellis graphics; Grid Graphics: One variable and two variables; Normal Distribution and Its Applications; Reporting.

İST305 Operational Research 3+0 6.0

Linear Programming: Introduction, Linear programming model, Assumptions of linear programming; Simplex Method; Transportation and Assignment Problems; Network Analysis: Shortest-path problem, Minimum spanning tree problem, Maximum flow problem; Pert Analysis; Dynamic Programming; Integer Programming; Nonlinear Programming; Queuing Theory; Inventory Theory: Deterministic models, Stochastic models; Decision Analysis.

İST309 Experimental Design I 3+0 6.0

Comparing Two Sample Means: Paired comparison of two dependent sample means, Unpaired comparison of two independent sample means, F distribution, Logic of analysis of variance, One-way classification analysis of variance, Randomized block design; Randomized Complete Block Design; Two-way Analysis of Variance; Incomplete Designs; Latin Square Design: Greco-Latin square design, Yauden square design.

İST309 (Eng) Experimental Design I 3+0 6.0

Comparing Two Sample Means: Paired comparison of two dependent sample means, Unpaired comparison of two independent sample means, F distribution, Logic of analysis of variance, One-way classification analysis of variance, Randomized block design; Randomized Complete Block Design; Two-way Analysis of Variance; Incomplete Designs; Latin Square Design: Greco-Latin square design, Yauden square design.

İST311 Non-Parametric Statistical Methods 3+0 5.5

Stages of a Statistical Test; Non-Parametric Methods For One sample: Binomial test, Kolmogorov-Smirnov test, Wilcoxon mark test, Series test; Independent Two Sample Tests: Chi-square, Median, Mann-Whitney, Kolmogorov-Smirnov tests; Paired Two Sample Test: Sign, Wilcoxon, McNemar tests; Tests for More Than Two Samples: Kruskal Wallis k sample test, Two-way variance analysis of Friedman; Cochran Q Test; Non-Parametric Correlation Coefficients: Chi-square and correlation coefficient.

İST311 (Eng) Non-Parametric Statistical Methods 3+0 5.5

Stages of a Statistical Test; Non-Parametric Methods For One sample: Binomial test, Kolmogorov-Smirnov test, Wilcoxon mark test, Series test; Independent Two Sample Tests: Chi-square, Median, Mann-Whitney, Kolmogorov-Smirnov tests; Paired Two Sample Test: Sign, Wilcoxon, McNemar tests; Tests for More Than Two Samples: Kruskal Wallis k sample test, Two-way variance analysis of Friedman; Cochran Q Test; Non-Parametric Correlation Coefficients: Chi-square and correlation coefficient.

İST331 Theoretical Hypothesis Testing 3+0 4.5

Elemantary and Joint Hypothesis; Tests; 1st and 2nd Type Errors; Power Functions; Neyman-Pearson Theorem; Mean Testing of Normal Distribution; Variance Testing of Normal Distribution; Behrens- Fisher Problems; Likelihood Ratio Test ; Sequential Likehood Ratio Test; Goodness of Fit Chi-Square Test; Kolmogorov- Shirnov Test; Non-Parametric Tests.

İST331 (Eng) Theoretical Hypothesis Testing 3+0 4.5

Elemantary and Joint Hypothesis; Tests; 1st and 2nd Type Errors; Power Functions; Neyman-Pearson Theorem; Mean Testing of Normal Distribution; Variance Testing of Normal Distribution; Behrens- Fisher Problems; Likelihood Ratio Test ; Sequential Likehood Ratio Test; Goodness of Fit Chi-Square Test; Kolmogorov- Shirnov Test; Non-Parametric Tests.

İST332 Decision Theory 2+0 3.0

Probability Distributions: Random experiment, Classic and relative frequency definitions of probability; Bayes Theorem; Decision Making: Alternative strategies, Events, Uncertainty, Decision Making under Uncertainty, Laplace, Pessimistic, Minimax, Optimistic, Hurwicz methods; Decision Making under Partial Uncertainty: Expected value of correct information, Prior analysis, Gain-loss functions, Normal prior distributions.

İST332 (Eng) Decision Making Theory 2+0 3.0

Probability Distributions: Random experiment, Classic and relative frequency definitions of probability; Bayes Theorem; Decision Making: Alternative strategies, Events, Uncertainty, Decision Making under Uncertainty, Laplace, Pessimistic, Minimax, Optimistic, Hurwicz methods; Decision Making under Partial Uncertainty: Expected value of correct information, Prior analysis, Gain-loss functions, Normal prior distributions.

İST333 Regression Analysis 4+0 6.5

Conditional expectation and regression concept; Simple linear regression model and ordinary least squares (OLS) estimators of parameters; Assumptions of linear regression; Properties of OLS estimators: Gauss-Markov theorem; Hypothesis testing and confidence intervals in simple linear regression; Coefficient of determination; Multiple linear regression model in Matrix notation and OLS estimators of parameters; Hypothesis testing and confidence intervals in multiple linear regression; Indicator (dummy) variable; Checking the assumptions (residual analysis); Multicollinearity; Variable selection; Heteroscedasticity; Autocorrelation.Conditional expectation and regression concept; Simple linear regression model and ordinary least squares (OLS) estimators of parameters; Assumptions of linear regression; Properties of OLS estimators: Gauss-Markov theorem; Hypothesis testing and confidence intervals in simple linear regression; Coefficient of determination; Multiple linear regression model in Matrix notation and OLS estimators of parameters; Hypothesis testing and confidence intervals in multiple linear regression; Indicator (dummy) variable; Checking the assumptions (residual analysis); Multicollinearity; Variable selection; Heteroscedasticity; Autocorrelation.

İST333 (Eng) Regression Analysis 4+0 6.5

Conditional expectation and regression concept; Simple linear regression model and ordinary least squares (OLS) estimators of parameters; Assumptions of linear regression; Properties of OLS estimators: Gauss-Markov theorem; Hypothesis testing and confidence intervals in simple linear regression; Coefficient of determination; Multiple linear regression model in Matrix notation and OLS estimators of parameters; Hypothesis testing and confidence intervals in multiple linear regression; Indicator (dummy) variable; Checking the assumptions (residual analysis); Multicollinearity; Variable selection; Heteroscedasticity; Autocorrelation.Conditional expectation and regression concept; Simple linear regression model and ordinary least squares (OLS) estimators of parameters; Assumptions of linear regression; Properties of OLS estimators: Gauss-Markov theorem; Hypothesis testing and confidence intervals in simple linear regression; Coefficient of determination; Multiple linear regression model in Matrix notation and OLS estimators of parameters; Hypothesis testing and confidence intervals in multiple linear regression; Indicator (dummy) variable; Checking the assumptions (residual analysis); Multicollinearity; Variable selection; Heteroscedasticity; Autocorrelation.

İST334 Experimental Design II 4+0 6.0

Comparison of Regression Analysis And Analysis f Variance: Advantages and disadvantages of the two techniques; Multifactor Experiments; 22 Factorial Designs; Two or More Repeated Designs; 32 Factorial Designs; Split-Plot Design; Analysis of Covariance; Fractional Replication; Post-Hoc Tests: Tukey, Scheffe, Dunnet, Duncan Tests.

İST334 (Eng) Experimental Design II 4+0 6.0

Comparison of Regression Analysis And Analysis f Variance: Advantages and disadvantages of the two techniques; Multifactor Experiments; 22 Factorial Designs; Two or More Repeated Designs; 32 Factorial Designs; Split-Plot Design; Analysis of Covariance; Fractional Replication; Post-Hoc Tests: Tukey, Scheffe, Dunnet, Duncan Tests.

İST335 Sampling 4+0 6.5

Principal Concepts and Descriptions; Simple Random Sampling: Choosing sample process, Estimation of parameters, Variances of estimators, Confidence intervals; Estimation of Sample Size: Estimation of sample size in simple random sampling, Cost factor in determining sample size; Stratified Sampling: Stratified random sampling, Optimum allocation to strata of sample size; Ratio Estimations: Ratio estimations in simple random sampling, Ratio estimations in stratified random sampling; Systematic Sampling: Choosing sample process, Estimation of parameters, Variances of estimators, Stratified systematic sampling; Cluster Sampling: Cluster sampling method for equal cluster sizes, Cluster sampling method for different cluster sizes.

İST337 Multivariate Time Series 3+0 4.0

Probability Space and Random Variable; Vector Time series; Stationary vector time series; Auto covariance and Autocorrelation matrix and their properties; Model Selection in Vector Time series; Vector Moving Average Series; Vector Autoregressive Series; Canonical Forms of Vector Time series; Non-stationary vector time series; Examples; The concept of Co-integration; Co-integration matrix and its properties; Estimation Methods of Co-integration Vector; Engle-Granger Method; Johansen Method

İST347 Spreadsheets and Databases 3+0 3.5

Introduction to Spreadsheets; Data Types and Data Entry; Data Import, Export; Data Binding from Multiple Workbooks; Adding Graphics and Editing; Using Macros in Spreadsheets and Programming; Introduction to Databases; Table, Form, Query, Reporting; Setting Up the Database Connection with Other Software.Introduction to Spreadsheets; Data Types and Data Entry; Data Import, Export; Data Binding from Multiple Workbooks; Adding Graphics and Editing; Using Macros in Spreadsheets and Programming; Introduction to Databases; Table, Form, Query, Reporting; Setting Up the Database Connection with Other Software.

İST347 (Eng) Spreadsheets and Databases 3+0 3.5

Introduction to Spreadsheets; Data Types and Data Entry; Data Import, Export; Data Binding from Multiple Workbooks; Adding Graphics and Editing; Using Macros in Spreadsheets and Programming; Introduction to Databases; Table, Form, Query, Reporting; Setting Up the Database Connection with Other Software.Introduction to Spreadsheets; Data Types and

Data Entry; Data Import, Export; Data Binding from Multiple Workbooks; Adding Graphics and Editing; Using Macros in Spreadsheets and Programming; Introduction to Databases; Table, Form, Query, Reporting; Setting Up the Database Connection with Other Software.

İST351 Statistical Packages I 2+0 3.0

Introduction to Minitab: Installing and starting the program; Minitab Main Menus: File and Edit menus, Data and Calc menus, Editor and Tools menus; Data Entry and Data Processing: Splitting and merging of data files, Line-column operations; Random Data Generation; Matrix Entry and Operations; Graph Menu and Plotting Graphics; Plotting Time Series Graphics; Stat Menu: Calculation of descriptive statistics, Frequency Series and creation of cross-tables, z and Student-t tests, Assessing the assumption of normality, One-way analysis of variance.

İST352 Statistical Packages II 2+0 3.0

Introduction to SPSS: Installing and starting the program; SPSS Main Menus: File, Edit and View menus, Data and Transform menus, Utilities, Add-ons, Window and Help menus; Data Entry and Variable Definitions; Selecting and Weighting of Cases According to Specific Criteria; Data Processing: Unit and variable operations, Splitting, merging and saving data files; Input of Survey Data; Graph Menu and Plotting Graphics; Stat Menu: Calculation of descriptive statistics, Frequency series and creation of cross-tables; Parametric Tests: z and Student-t tests, Assessing the assumption of normality, One-way analysis of variance.

İST356 Programming with Python 4+0 5.0

Introduction to Python Programming and Basic Concepts: Variables, Data types, Operators; Lists, Tuples, Sets and Dictionaries in Python; Data Entry and Exit Operations: Processors, Operators; Logical Control and Comparison Operations; Loops; Basic Functions; Operations in Modules; Error Handling in Python; Function Definition and Using Module; Graphing and Visualization in Python; Statistics Applications with Python

İST358 (Eng) Database and Management 3+0 4.5

İST407 Statistics Project I 0+4 6.0

Decision on Project Subject: Subject and purposes of project, Pre-data analysis, Data collection, Literature investigation and pre-tests, Project design, Decision on sampling, Analysis and application, Decision on Project Subject: Subject and purposes of project, Pre-data analysis, Data collection, Literature investigation and pre-tests, Project design, Decision on sampling, Analysis and application.

İST407 (Eng) Statistics Project I 0+4 6.0

Decision on Project Subject: Subject and purposes of project, Pre-data analysis, Data collection, Literature investigation and pre-tests, Project design, Decision on sampling, Analysis and application, Decision on Project Subject: Subject and purposes of project, Pre-data analysis, Data collection, Literature investigation and pre-tests, Project design, Decision on sampling, Analysis and application.

İST408 Statistics Project II 0+4 6.0

Application and Analysis of Project: Decision on statistical techniques, Obtaining results from statistical computer packages, Report writing, Preparation of thesis for the project.

İST408 (Eng) Statistics Project II 0+4 6.0

Application and Analysis of Project: Decision on statistical techniques, Obtaining results from statistical computer packages, Report writing, Preparation of thesis for the project.

İST411 Time Series Analysis 4+0 5.0

Definition and Properties of Time Series; Purposes of Time Series Analysis; Classification of Time Series: Stationary and non-stationary time series, seasonal and non-seasonal series; Forecasting in Time Series Analysis by Using One Variable Technique: Trend analysis, Moving averages, Exponential smoothing; Linear Stationary Stochastic Models: AR and MA models; Non-Stationary Linear Stochastic Models: ARIMA models, Seasonal models.

İST412 Fuzzy Logic 2+0 3.0

Fuzzy logic and vagueness; Relation between Fuzzy Logic and Statistics; Fuzzy Set theory: Fuzzy sets, Crisp sets, Fuzzy Set Operations; Fuzzy logic membership functions: Triangular membership function, Trapeozoid membership function, Gaussian membership function, Generalized membership function; Fuzzy logic inference systems: Mamdani fuzzy model, Sugeno fuzzy model, Tsukamoto fuzzy model; Matlab applications and sample applications.

İST413 Introduction to Artificial Neural Networks 3+0 5.0

Introduction to Artificial Neural Networks; Biological Neural Networks; Activation Functions; Architectures of Artificial Neural Network; Mc Culloch-Pitts Neurons; Simple Artificial Neural Networks for Pattern Classification; Linear Separability; Hebb Learning Algorithm; Perceptron; Architecture and Learning Algorithm of Perceptron; Multilayer Feed Forward Neural Networks; Backpropagation Algorithms.

İST415 Reliability Analysis 3+0 5.0

Fundamental Concepts of Reliability: Failure rate function, Cumulative failure rate function and bathtub curve, Conditional reliability and mean time to failure; Constant Failure Rate Model: Two-parameter exponential distribution; Time-dependent Failure Models: Weibull distribution, Normal distribution and Lognormal distribution; Reliability of Systems: Series systems, Parallel systems, Series-parallel systems; Implementation of Survival Analysis in Reliability; Exponential and Weibull Models in Survival Analysis; Kaplan-Meier Method and Cox Regression Analysis.

İST420 Demography 2+0 3.0

Population; Population Theories; Population Census; Population Politics; Analysis of Population according to Sex; Dividing Population into Standard Types; Determining Age; Determining Population according to Age; Errors Related to Determining Age; Age Pyramid; Distribution of Age; Births: Factors on births, Birth rates; Deaths: Factors on deaths, Death rates; Marriages and Divorces: Changes in marriage rates, Changes in divorce rates.

İST425 Risk Management in Actuary 4+0 6.0

Definition of actuarial risk; Functions in actuarial risk management; Loss functions; Mixed distributions; General and individual risk models; Population models and mortality power; Strategic Actuarial Decision Problems; Conditional distributions for the expected loss; Stochastic processes in risk management; Short-term actuarial risk management: Middle- and Long-term actuarial risk management; Life insurance; Individual retirement funds.Definition of actuarial risk; Functions in actuarial risk management; Loss functions; Mixed distributions; General and individual risk models; Population models and mortality power; Strategic Actuarial Decision Problems; Conditional distributions for the expected loss; Stochastic processes in risk management; Short-term actuarial risk management: Middle- and Long-term actuarial risk management; Life insurance; Individual retirement funds.

İST425 (Eng) Risk Management in Actuary 4+0 6.0

Definition of actuarial risk; Functions in actuarial risk management; Loss functions; Mixed distributions; General and individual risk models; Population models and mortality power; Strategic Actuarial Decision Problems; Conditional distributions for the expected loss; Stochastic processes in risk management; Short-term actuarial risk management: Middle- and Long-term actuarial risk management; Life insurance; Individual retirement funds.Definition of actuarial risk; Functions in actuarial risk management; Loss functions; Mixed distributions; General and individual risk models; Population models and mortality power; Strategic Actuarial Decision Problems; Conditional distributions for the expected loss; Stochastic processes in risk management; Short-term actuarial risk management: Middle- and Long-term actuarial risk management; Life insurance; Individual retirement funds.

İST430 Stochastic Processes 4+0 5.0

Definition of a Probabilistic Process: Independently increased process, Stationary process, Markov chain; Discrete Markov chain: Transition probabilities, Probability vector and probability matrix, Relation between initial probability and n-step probability vector; 2 State Markov Chain; Classification of States and Limit Theorem: Generating functions, Limit theorems; Closed Cluster: Nonrecurring Markov chain; Eigen values and Eigen vectors of Transition Matrix; Recurrent Markov Chain.; Birth and Death processes.

İST432 Simulation 4+0 6.0

Simulation modeling concept and discrete event simulation, Random number generation and testing; Generating random varieties; Simulation software, Building simulation models, Selection of probability distributions for model inputs, Validation and verification of simulation models; Output analysis, Comparison of alternative systems, Applications of computer simulations.Simulation modeling concept and discrete event simulation, Random number generation and testing; Generating random varieties; Simulation software, Building simulation models, Selection of probability distributions for model inputs, Validation and verification of simulation models; Output analysis, Comparison of alternative systems, Applications of computer simulations.

İST432 (Eng) Simulation 4+0 6.0

Simulation modeling concept and discrete event simulation, Random number generation and testing; Generating random varieties; Simulation software, Building simulation models, Selection of probability distributions for model inputs, Validation and verification of simulation models; Output analysis, Comparison of alternative systems, Applications of computer simulations.Simulation modeling concept and discrete event simulation, Random number generation and testing; Generating random varieties; Simulation software, Building simulation models, Selection of probability distributions for model inputs, Validation and verification of simulation models; Output analysis, Comparison of alternative systems, Applications of computer simulations.

İST438 (Eng) Machine Learning Methods and Applications 3+0 4.5

Introduction to Machine Learning; Basics of Machine Learning; Linear Regression: Simple linear regression, Multiple linear regression; Variable Selection and Regularization; Subsample Selection; Resampling and Model Evaluation: Train-test-validation sets, Cross-validation, Bootstrapping; Bias-Variance Tradeoff; Comparison of The Models; Supervised Learning; Logistic Regression; K-Nearest Neighbors; Ensemble Learning: Bagging, Boosting; Unsupervised Learning; K-means algorithm.

İST451 Multivariate Statistics I 4+0 6.0

Introduction: The organization of the data, descriptive statistics, graphical techniques; Distance: Euclidean distance, graphical representation; Matrix algebra and random vectors: eigenvectors-eigenvalues, quadratic forms; Mean vectors and covariance matrices: linear combinations of random variables; Random samples and the expected values of the sample mean and covariance matrix; Partitioning the covariance matrix; The multivariate normal distribution: properties, bivariate normal distribution; Sampling from multivariate normal distribution maximum likelihood estimation; Inferences about mean vector: Hotelling' s T2; Comparison of several multivariate means: MANOVA; Principal component analysis; Factor analysis; Factor rotation and factor scores: Application of PCA and FA.Introduction: The organization of the data, descriptive statistics, graphical techniques; Distance: Euclidean distance, graphical representation; Matrix algebra and random vectors: eigenvectors-eigenvalues, quadratic forms; Mean vectors and covariance matrices: linear combinations of random variables; Random samples and the expected values of the sample mean and covariance matrix; Partitioning the covariance matrix; The multivariate normal distribution: properties, bivariate normal distribution; Sampling from multivariate normal distribution maximum likelihood estimation; Inferences about mean vector: Hotelling' s T2; Comparison of several multivariate means: MANOVA; Principal component analysis; Factor analysis; Factor rotation and factor scores: Application of PCA and FA.

İST451 (Eng) Multivariate Statistics I 4+0 6.0

Introduction: The organization of the data, descriptive statistics, graphical techniques; Distance: Euclidean distance, graphical representation; Matrix algebra and random vectors: eigenvectors-eigenvalues, quadratic forms; Mean vectors and covariance matrices: linear combinations of random variables; Random samples and the expected values of the sample mean and covariance matrix; Partitioning the covariance matrix; The multivariate normal distribution: properties, bivariate normal distribution; Sampling from multivariate normal distribution maximum likelihood estimation; Inferences about mean vector: Hotelling' s T2; Comparison of several multivariate means: MANOVA; Principal component analysis; Factor analysis; Factor rotation and factor scores: Application of PCA and FA.Introduction: The organization of the data, descriptive statistics, graphical techniques; Distance: Euclidean distance, graphical representation; Matrix algebra and random vectors: eigenvectors-eigenvalues, quadratic forms; Mean vectors and covariance matrices: linear combinations of random variables; Random samples and the expected values of the sample mean and covariance matrix; Partitioning the covariance matrix; The multivariate normal distribution: properties, bivariate normal distribution; Sampling from multivariate normal distribution maximum likelihood estimation; Inferences about mean vector: Hotelling' s T2; Comparison of several multivariate means: MANOVA; Principal component analysis; Factor analysis; Factor rotation and factor scores: Application of PCA and FA.

İST452 Multivariate Statistics II 4+0 6.0

Introduction: Classical linear regression model, Geometry of least squares; Multivariate Multiple Regression; Predictions of several variables and partial correlation coefficient; Canonical correlation analysis: Introduction, objective of canonical correlation analysis; The sample canonical correlation variates and sample canonical correlations; Discrimination and Classification: Introduction; Classification with two multivariate normal population; Fisher's approach to classification; Logistic regression and classification: Introduction, the logit model; Logistic regression with binomial responses; Clustering analysis: Introduction, similarity measures; Hierarchical clustering methods: Single linkage, complete linkage, average linkage; Nonhierarchical clustering methods: k-means method; Correspondence analysis.Introduction: Classical linear regression model, Geometry of least squares; Multivariate Multiple Regression; Predictions of several variables and partial correlation coefficient; Canonical correlation analysis: Introduction, objective of canonical correlation analysis; The sample canonical correlation variates and sample canonical correlations; Discrimination and Classification: Introduction; Classification with two multivariate normal population; Fisher's approach to classification; Logistic regression and classification: Introduction, the logit model; Logistic regression with binomial responses; Clustering analysis: Introduction, similarity measures; Hierarchical clustering methods: Single linkage, complete linkage, average linkage; Nonhierarchical clustering methods: k-means method; Correspondence analysis.

İST452 (Eng) Multivariate Statistics II 4+0 6.0

Introduction: Classical linear regression model, Geometry of least squares; Multivariate Multiple Regression; Predictions of several variables and partial correlation coefficient; Canonical correlation analysis: Introduction, objective of canonical correlation analysis; The sample canonical correlation variates and sample canonical correlations; Discrimination and Classification: Introduction; Classification with two multivariate normal population; Fisher's approach to classification; Logistic regression and classification: Introduction, the logit model; Logistic regression with binomial responses; Clustering analysis: Introduction, similarity measures; Hierarchical clustering methods: Single linkage, complete linkage, average linkage; Nonhierarchical clustering methods: k-means method; Correspondence analysis.Introduction: Classical linear

regression model, Geometry of least squares; Multivariate Multiple Regression; Predictions of several variables and partial correlation coefficient; Canonical correlation analysis: Introduction, objective of canonical correlation analysis; The sample canonical correlation variates and sample canonical correlations; Discrimination and Classification: Introduction; Classification with two multivariate normal population; Fisher's approach to classification; Logistic regression and classification: Introduction, the logit model; Logistic regression with binomial responses; Clustering analysis: Introduction, similarity measures; Hierarchical clustering methods: Single linkage, complete linkage, average linkage; Nonhierarchical clustering methods: k-means method; Correspondence analysis.

İŞL101 Introduction to Business 3+0 4.5

Concept of business: Economic systems, Production factors, Needs and wants, Demand, Goods and services, Consumption and consumer; Success criterion: Efficiency and related concepts; Characteristics of Businesses: Goals and functions of businesses, Relationships with the environment and responsibilities of businesses, Grouping of businesses; Foundation of businesses: Foundation decision, Determining plant location; Extending Businesses; Business ethics and social responsibility (Ethical and moral rules); Concept of management; Functions of management; Human resources management; Functions of human resources management; Principles of marketing.Concept of business: Economic systems, Production factors, Needs and wants, Demand, Goods and services, Consumption and consumer; Success criterion: Efficiency and related concepts; Characteristics of Businesses: Goals and functions of businesses, Relationships with the environment and responsibilities of businesses, Grouping of businesses; Foundation of businesses: Foundation decision, Determining plant location; Extending Businesses; Business ethics and social responsibility (Ethical and moral rules); Concept of management; Functions of management; Human resources management; Functions of human resources management; Principles of marketing.

İŞL101 (Eng) Introduction to Business 3+0 4.5

Concept of business: Economic systems, Production factors, Needs and wants, Demand, Goods and services, Consumption and consumer; Success criterion: Efficiency and related concepts; Characteristics of Businesses: Goals and functions of businesses, Relationships with the environment and responsibilities of businesses, Grouping of businesses; Foundation of businesses: Foundation decision, Determining plant location; Extending Businesses; Business ethics and social responsibility (Ethical and moral rules); Concept of management; Functions of management; Human resources management; Functions of human resources management; Principles of marketing.Concept of business: Economic systems, Production factors, Needs and wants, Demand, Goods and services, Consumption and consumer; Success criterion: Efficiency and related concepts; Characteristics of Businesses: Goals and functions of businesses, Relationships with the environment and responsibilities of businesses, Grouping of businesses; Foundation of businesses: Foundation decision, Determining plant location; Extending Businesses; Business ethics and social responsibility (Ethical and moral rules); Concept of management; Functions of management; Human resources management; Functions of human resources management; Principles of marketing.

İŞL215 Time Management 1+1 3.0

Time and Time Management: Concept of time, Time management; Historical Development of Time Management; Time Traps; Authority Transfer; Ability to Say No; Supplementary Techniques in Time Management; Classical Time Management Techniques: First generation, Second generation, Third generation; New Approaches; Time Using Matrix, Stages in Effective Time Management; Importance of Communication; Personal Development; Case Studies.Time and Time Management: Concept of time, Time management; Historical Development of Time Management; Time Traps; Authority Transfer; Ability to Say No; Supplementary Techniques in Time Management; Classical Time Management Techniques: First generation, Second generation, Third generation; New Approaches; Time Using Matrix, Stages in Effective Time Management; Importance of Communication; Personal Development; Case Studies

İŞL215 (Eng) Time Management 1+1 3.0

Time and Time Management: Concept of time, Time management; Historical Development of Time Management; Time Traps; Authority Transfer; Ability to Say No; Supplementary Techniques in Time Management; Classical Time Management Techniques: First generation, Second generation, Third generation; New Approaches; Time Using Matrix, Stages in Effective Time Management; Importance of Communication; Personal Development; Case Studies.Time and Time Management: Concept of time, Time management; Historical Development of Time Management; Time Traps; Authority Transfer; Ability to Say No; Supplementary Techniques in Time Management; Classical Time Management Techniques: First generation, Second generation, Third generation; New Approaches; Time Using Matrix, Stages in Effective Time Management; Importance of Communication; Personal Development; Case Studies

İŞL421 Entrepreneurship 2+0 3.0

Importance and Evolution of Entrepreneurship: Entrepreneurship within the framework of Manager, Concepts of Entrepreneur, Employer, Boss and Investor; Leadership in Entrepreneurship and Importance of Management Characteristics; Characteristics of Entrepreneurship; Changing Views of Entrepreneurship; General Evaluation of Entrepreneurship in Turkey: Change and Entrepreneurship; Entrepreneurship before and after the Republic; Female Entrepreneurs.

İŞL459 (Eng) Project Management 2+0 5.0

Basic Project management concepts, scope management, time management, CPM, PERT, Gantt graphics, cost management, quality management, human resources management, communication management, risk management, procurement management, Project management with MS Project software.Basic Project management concepts, scope management, time management, CPM, PERT, Gantt graphics, cost management, quality management, human resources management, communication management, risk management, procurement management, Project management with MS Project software.

İŞL475 Techno-Entrepreneurship 3+0 4.0

Techno-Entrepreneurship: Definitions, Concepts, History; Creativity and Innovation: Concepts, Innovation types, Situation in Turkey and world; Idea to Market: Emergence and commercialization process of business idea, road maps; Entrepreneurial Marketing: Concepts, strategy and implementation; Managerial Issues: Performance, Team work, Strategic orientations; Legal Issues: Patents, Copyrights, Law and regulations; Financial Issues: Sources of funding, Sponsorships; Characteristics of Techno-Entrepreneur: Background, Education, Personality; Sustainability and Innovator's Dilemma: Concepts, Reasons of failure; Future of Techno-Entrepreneurship: Trends.

JEO101 General Geology 2+0 2.0

Introduction to Geology; The Solar System and The Universe; General Properties of the Earth's Crust; Composition of The Earth: Minerals and Rocks; General Properties of Layered Rocks: Layer, Layering, Surface structures of layers; Determination of Age in Geology; Origin and Evolution of Life; Basis for Theory of Evolution; Evolution of Living Creatures; Tectonic Deformations: Magma, Volcanism, Plutonism; Metamorphism; Plate Tectonics; Weathering and Origin of Soil; Ground Water.

KİM103 General Chemistry I 4+2 6.0

Matter; Measurements and Moles; Chemical Reactions; Reaction Stoichiometry; Properties of Gases; Thermo chemistry; Atomic Structure; Chemical Bonds; Molecules: Shape, Size, Bond strength; Liquid and Solid Materials; Carbon-Based Materials.Matter; Measurements and Moles; Chemical Reactions; Reaction Stoichiometry; Properties of Gases; Thermochemistry; Atomic Structure; Chemical Bonds; Molecules: Shape, Size, Bond Strength; Liquid and Solid Materials; Carbon-Based Materials.

KİM103 (Eng) General Chemistry I 4+2 6.0

Matter; Measurements and Moles; Chemical Reactions; Reaction Stoichiometry; Properties of Gases; Thermo chemistry; Atomic Structure; Chemical Bonds; Molecules: Shape, Size, Bond strength; Liquid and Solid Materials; Carbon-Based Materials.Matter; Measurements and Moles; Chemical Reactions; Reaction Stoichiometry; Properties of Gases; Thermochemistry; Atomic Structure; Chemical Bonds; Molecules: Shape, Size, Bond Strength; Liquid and Solid Materials; Carbon-Based Materials.

KİM104 General Chemistry II 4+2 6.0

The Properties of Solutions; Chemical Equilibrium; Acids and Bases; Water Solutions; Thermodynamics; Electrochemistry; Chemical Kinetics; Main-Group Elements; Transition Metals; Nuclear Chemistry.The Properties of Solutions; Chemical Equilibrium; Acids and Bases; Water Solutions; Thermodynamics; Electrochemistry; Chemical Kinetics; Main-Group Elements; Transition Metals; Nuclear Chemistry.

KİM104 (Eng) General Chemistry II 4+2 6.0

The Properties of Solutions; Chemical Equilibrium; Acids and Bases; Water Solutions; Thermodynamics; Electrochemistry; Chemical Kinetics; Main-Group Elements; Transition Metals; Nuclear Chemistry.The Properties of Solutions; Chemical Equilibrium; Acids and Bases; Water Solutions; Thermodynamics; Electrochemistry; Chemical Kinetics; Main-Group Elements; Transition Metals; Nuclear Chemistry.

KİM121 General Chemistry Laboratory I 0+3 2.0

Knowledge and Principles in Laboratory; Conservation of Matter Identification (Description) from Physical and Chemical Properties; Determination of Densities of Solids and Liquids; Sublimation and Distillation Experiments; Determination of Boiling-point and Freezing-point; Determination of the Molecular Mass of a Metal; Thermal Decomposition of Potassium Chlorate, Determination of Copper (II) oxide in Copper (II) carbonate; Determination of Crystal Water in Copper Sulfate Penta Hydrate; Determination of Molar Volume of Gases.

KİM121 (Eng) General Chemistry Laboratory I 0+3 2.0

Knowledge and Principles in Laboratory; Conservation of Matter Identification (Description) from Physical and Chemical Properties; Determination of Densities of Solids and Liquids; Sublimation and Distillation Experiments; Determination of Boiling-point and Freezing-point; Determination of the Molecular Mass of a Metal; Thermal Decomposition of Potassium Chlorate, Determination of Copper (II) oxide in Copper (II) carbonate; Determination of Crystal Water in Copper Sulfate Penta Hydrate; Determination of Molar Volume of Gases.

KİM122 General Chemistry Laboratory II 0+3 2.0

Preparation of a Solution; Solubility of Alcohols in Water and Ether; Determination of the Solubility of Matter; Determination of the Composition of Potassium Nitrate Copper (II) Nitrate; Determination of Molecular Mass from Boiling-point Elevation and Freezing-point Depression; Acid-Base Titration; Precipitation of Barium Sulfate; Precipitation of Iron (III) Hydroxide; Investigation of Metal Activity; Effect of Concentration and Temperature on Reaction Rate; Effect of Surface Area and Catalyst on Reaction Rate; Chemical Equilibrium.

KİM122 (Eng) General Chemistry Laboratory II 0+3 2.0

Preparation of a Solution; Solubility of Alcohols in Water and Ether; Determination of the Solubility of Matter; Determination of the Composition of Potassium Nitrate Copper (II) Nitrate; Determination of Molecular Mass from Boiling-point Elevation and Freezing-point Depression; Acid-Base Titration; Precipitation of Barium Sulfate; Precipitation of Iron (III) Hydroxide; Investigation of Metal Activity; Effect of Concentration and Temperature on Reaction Rate; Effect of Surface Area and Catalyst on Reaction Rate; Chemical Equilibrium.

KİM129 General Chemistry 4+0 4.0

Matter: Elements, Compounds, Mixtures; Moles; Measurements and Units; Chemical Reactions; Reaction Stoichiometry; Structure of the Atom; Chemical Bonds; Molecules: Shape, Size, Bond strength; Properties of Gases; Gas Laws; Liquid and Solid Materials; Properties of Solutions; Acids and Bases; Water Solutions; Titrations; Buffer Solutions; Chemical Kinetics; Chemical Equilibrium; Thermodynamics; Electrochemistry.Matter: Elements, Compounds, Mixtures; Moles; Measurements and Units; Chemical Reactions; Reaction Stoichiometry; Structure of the Atom; Chemical Bonds; Molecules: Shape, Size, Bond strength; Properties of Gases; Gas Laws; Liquid and Solid Materials; Properties of Solutions; Acids and Bases; Water Solutions; Titrations; Buffer Solutions; Chemical Kinetics; Chemical Equilibrium; Thermodynamics; Electrochemistry.

KİM129 (Eng) General Chemistry 4+0 4.0

Matter: Elements, Compounds, Mixtures; Moles; Measurements and Units; Chemical Reactions; Reaction Stoichiometry; Structure of the Atom; Chemical Bonds; Molecules: Shape, Size, Bond strength; Properties of Gases; Gas Laws; Liquid and Solid Materials; Properties of Solutions; Acids and Bases; Water Solutions; Titrations; Buffer Solutions; Chemical Kinetics; Chemical Equilibrium; Thermodynamics; Electrochemistry.Matter: Elements, Compounds, Mixtures; Moles; Measurements and Units; Chemical Reactions; Reaction Stoichiometry; Structure of the Atom; Chemical Bonds; Molecules: Shape, Size, Bond strength; Properties of Gases; Gas Laws; Liquid and Solid Materials; Properties of Solutions; Acids and Bases; Water Solutions; Titrations; Buffer Solutions; Chemical Kinetics; Chemical Equilibrium; Thermodynamics; Electrochemistry.

KİM131 General Chemistry Laboratory 0+2 2.0

Chemistry Laboratory Safety Rules; Writing a Laboratory Report; Rules Cleaning Laboratory Glassware; Identification of Substances by Physical and Chemical Properties; Law of Conservation of Mass; Density of Substances; Melting and Boiling Points; Separation and Purification Processes; Solubility; Solutions, Colloids and Suspensions; Solution Preparation; Titration Acid-Base; Reaction Rates and Equilibrium.Chemistry Laboratory Safety Rules; Writing a Laboratory Report; Rules Cleaning Laboratory Glassware; Identification of Substances by Physical and Chemical Properties; Law of Conservation of Mass; Density of Substances; Melting and Boiling Points; Separation and Purification Processes; Solubility; Solutions, Colloids and Suspensions; Solution Preparation; Titration Acid-Base; Reaction Rates and Equilibrium.

KİM131 (Eng) General Chemistry Laboratory 0+2 2.0

Chemistry Laboratory Safety Rules; Writing a Laboratory Report; Rules Cleaning Laboratory Glassware; Identification of Substances by Physical and Chemical Properties; Law of Conservation of Mass; Density of Substances; Melting and Boiling Points; Separation and Purification Processes; Solubility; Solutions, Colloids and Suspensions; Solution Preparation; Titration Acid-Base; Reaction Rates and Equilibrium.Chemistry Laboratory Safety Rules; Writing a Laboratory Report; Rules Cleaning Laboratory Glassware; Identification of Substances by Physical and Chemical Properties; Law of Conservation of Mass; Density of Substances; Melting and Boiling Points; Separation and Purification Processes; Solubility; Solutions, Colloids and Suspensions; Solution Preparation; Titration Acid-Base; Reaction Rates and Equilibrium.

KİM133 General Chemistry I 5+0 6.0

Matter: The elements, Compounds, Mixtures; Measurements and the Concept Mole: Determination of chemical formulas, Chemical Reactions-Modifying Matter: Chemical equations and chemical reactions; Reaction Stoichiometry: How to use reaction stoichiometry; The Properties of Gases: The gas laws; Thermo-chemistry Energy, Heat, and Enthalpy: The enthalpy of chemical change, The heat output of reactions; Observing Atoms: Models of atoms; Chemical Bonds; Molecules-Shape, Size and Bond Strength; Liquid and Solid Materials: Liquid structure, Solid structures; Carbon-Based Materials: Hydrocarbons, Polymers.Matter: The elements, Compounds, Mixtures; Measurements and the Concept Mole: Determination of chemical formulas, Chemical Reactions-Modifying Matter: Chemical equations and chemical reactions; Reaction Stoichiometry: How to use reaction stoichiometry; The Properties of Gases: The gas laws; Thermo-chemistry Energy, Heat, and Enthalpy: The enthalpy of chemical change, The heat output of reactions; Observing Atoms: Models of atoms; Chemical Bonds; Molecules-Shape, Size and Bond Strength; Liquid and Solid Materials: Liquid structure, Solid structures; Carbon-Based Materials: Hydrocarbons, Polymers.

KİM133 (Eng) General Chemistry I 5+0 6.0

Matter: The elements, Compounds, Mixtures; Measurements and the Concept Mole: Determination of chemical formulas, Chemical Reactions-Modifying Matter: Chemical equations and chemical reactions; Reaction Stoichiometry: How to use reaction stoichiometry; The Properties of Gases: The gas laws; Thermo-chemistry Energy, Heat, and Enthalpy: The enthalpy of chemical change, The heat output of reactions; Observing Atoms: Models of atoms; Chemical Bonds; Molecules-Shape, Size and Bond Strength; Liquid and Solid Materials: Liquid structure, Solid structures; Carbon-Based Materials: Hydrocarbons, Polymers.Matter: The elements, Compounds, Mixtures; Measurements and the Concept Mole: Determination of chemical formulas, Chemical Reactions-Modifying Matter: Chemical equations and chemical reactions; Reaction Stoichiometry: How to use reaction stoichiometry; The Properties of Gases: The gas laws; Thermo-chemistry Energy, Heat, and Enthalpy: The enthalpy of chemical change, The heat output of reactions; Observing Atoms: Models of atoms; Chemical Bonds; Molecules-Shape, Size and Bond Strength; Liquid and Solid Materials: Liquid structure, Solid structures; Carbon-Based Materials: Hydrocarbons, Polymers.

KİM134 General Chemistry II 5+0 6.0

The Properties of Solutions: Solutes and solvents; Chemical Equilibrium: Using equilibrium constant; Protons in Transition-Acids and Bases: Weak acids and bases; Salts in Water: Ions as acids and bases, Titrations, Buffer solutions; Energy in Transition-Thermodynamics: The first law of thermodynamics; Electrons in Transition-Electrochemistry: Galvanic cells, Electrolysis; Kinetics-The Rate of Reactions: Concentration and rate, Reaction mechanisms; The Main Group Elements I-The First four Families; The Main Group Elements II-The Last Four Families; The dBlock Metals in Transition; Nuclear Chemistry: Radioactivitiy, Nuclear energy.The Properties of Solutions: Solutes and solvents; Chemical Equilibrium: Using equilibrium constant; Protons in Transition-Acids and Bases: Weak acids and bases; Salts in Water: Ions as acids and bases, Titrations, Buffer solutions; Energy in Transition-Thermodynamics: The first law of thermodynamics; Electrons in Transition-Electrochemistry: Galvanic cells, Electrolysis; Kinetics-The Rate of Reactions: Concentration and rate, Reaction mechanisms; The Main Group Elements I-The First four Families; The Main Group Elements II-The Last Four Families; The dBlock Metals in Transition; Nuclear Chemistry: Radioactivitiy, Nuclear energy.

KİM134 (Eng) General Chemistry II 5+0 6.0

The Properties of Solutions: Solutes and solvents; Chemical Equilibrium: Using equilibrium constant; Protons in Transition-Acids and Bases: Weak acids and bases; Salts in Water: Ions as acids and bases, Titrations, Buffer solutions; Energy in Transition-Thermodynamics: The first law of thermodynamics; Electrons in Transition-Electrochemistry: Galvanic cells, Electrolysis; Kinetics-The Rate of Reactions: Concentration and rate, Reaction mechanisms; The Main Group Elements I-The First four Families; The Main Group Elements II-The Last Four Families; The dBlock Metals in Transition; Nuclear Chemistry: Radioactivitiy, Nuclear energy.The Properties of Solutions: Solutes and solvents; Chemical Equilibrium: Using equilibrium constant; Protons in Transition-Acids and Bases: Weak acids and bases; Salts in Water: Ions as acids and bases, Titrations, Buffer solutions; Energy in Transition-Thermodynamics: The first law of thermodynamics; Electrons in Transition-Electrochemistry: Galvanic cells, Electrolysis; Kinetics-The Rate of Reactions: Concentration and rate, Reaction mechanisms; The Main Group Elements I-The First four Families; The Main Group Elements II-The Last Four Families; The dBlock Metals in Transition; Nuclear Chemistry: Radioactivitiy, Nuclear energy.

KİM208 Organic Chemistry 3+0 4.0

Structure, Reactivity and Mechanism; Mechanisms of Electrophilic and Nucleophilic Substitution Reactions; Chemical Bonds; Alkanes; Alkenes; Alkynes; Nomenclature of Organic Compounds; Alcohols; Alkyl Halides; Ethers; Geometric and Stereo chemical Isomers; Aldehydes and Ketones; Carboxylic Acids; Esters; Acyl Halides; Amids; Concept of Aromacity; Aromatic Substitutions; Aromatic Nitro Compounds; Phenols; Aromatic Aldehydes and Ketones; Aromatic Acids; Aromatic Amines.Structure, Reactivity and Mechanism; Mechanisms of Electrophilic and Nucleophilic Substitution Reactions; Chemical Bonds; Alkanes; Alkenes; Alkynes; Nomenclature of Organic Compounds; Alcohols; Alkyl Halides; Ethers; Geometric and Stereo chemical Isomers; Aldehydes and Ketones; Carboxylic Acids; Esters; Acyl Halides; Amids; Concept of Aromacity; Aromatic Substitutions; Aromatic Nitro Compounds; Phenols; Aromatic Aldehydes and Ketones; Aromatic Acids; Aromatic Amines.

KİM208 (Eng) Organic Chemistry 3+0 4.0

Structure, Reactivity and Mechanism; Mechanisms of Electrophilic and Nucleophilic Substitution Reactions; Chemical Bonds; Alkanes; Alkenes; Alkynes; Nomenclature of Organic Compounds; Alcohols; Alkyl Halides; Ethers; Geometric and Stereo chemical Isomers; Aldehydes and Ketones; Carboxylic Acids; Esters; Acyl Halides; Amids; Concept of Aromacity; Aromatic Substitutions; Aromatic Nitro Compounds; Phenols; Aromatic Aldehydes and Ketones; Aromatic Acids; Aromatic Amines.Structure, Reactivity and Mechanism; Mechanisms of Electrophilic and Nucleophilic Substitution Reactions; Chemical Bonds; Alkanes; Alkenes; Alkynes; Nomenclature of Organic Compounds; Alcohols; Alkyl Halides; Ethers; Geometric and Stereo chemical Isomers; Aldehydes and Ketones; Carboxylic Acids; Esters; Acyl Halides; Amids; Concept of Aromacity; Aromatic Substitutions; Aromatic Nitro Compounds; Phenols; Aromatic Aldehydes and Ketones; Aromatic Acids; Aromatic Amines.

KİM209 Mathematical Methods for Chemistry 2+0 3.0

Significant Figures: Significant figure, Numbers and measurements, Arithmetic operations; Use of Logarithms, Matrices and Determinants in Chemistry Problems; Plotting Graphs of Experimental Data: Finding the equation of a straight line from a graph, Least squares and linear regression; Interpolation and Extrapolation; Errors and Treatment of Experimental Data: Experimental errors, Random error, Standard deviation, Student's t.

KİM215 Environnant Problems 2+0 3.0

Environnemental Pollution: General topics, Environmental legislation; Waters Pollution: Water pollution sources, Pollutants effects, Rivers and lakes pollution, Properties of wastewater and environmental effects, Chemical analysis in the control of water pollution; Air Pollution: Pollutant components and effects, Control methods, Chemical analysis in the control of air pollution; Soil Pollution: Soil pollution sources, Pollutants movement through the soil; Solid Wastes: Solid waste sources, properties, Disposal methods; Other Environmental Problems: Noise, Odour, Radioactive pollution.

KİM217 Basics About Safe Working Techniques in Chemistry Laboratories 2+0 3.0

Safe Handling of Basic Laboratory Equipments; Eye and Safety Precautions for Eye Protection; Labeling of Chemicals to Indicate Their Basic Properties; Safe Transport and Storage of Chemicals; Basic Principles of Safe Working with Chemicals; Carcinogenic, Teratogenic, Mutagenic Chemicals and Basics About Safe Working with These Chemicals; Precautions and Causes of Fire and Explosion in Laboratories; Electricity Safety in Laboratories; Microbiological Safety In Laboratories.

KİM218 Radiation in Daily Life 2+0 3.0

Fundamental Principles of Radiation; Classification of Radiation: Nonionizing radiation (Electromagnetic Radiation), İonizing radiation (Nuclear Radiation); Interaction of Electromagnetic Radiation with the living; Nuclear Radiation: Units of ionizing radiation and safety limits, Effect of ionizing radiation, Radioactive wastes and environmental problems; Applications of Electromagnetic Radiation: Biomedical applications of electromagnetic waves, Industrial applications of micro waves, Applications of nuclear energy; Protection of people from nonionizing radiation, Protection of people from ionizing radiation.

KİM221 Analytical Chemistry Laboratory I 0+6 3.0

Separations in Groups of Cations with the Hydrogen Sulfide Method; Characteristic Reactions of First and Second Group Cations and their Separations; Characteristic Reactions of Third, Fourth and Fifth Group Cations and their Separations; Characteristic Reactions of First and Second Group Anions and their Separations; Characteristic Reactions of Third, Fourth and Fifth Group Anions and their Separations; Systematic Analysis of Cations and Anions in an Unknown Sample; Quantitative Determination of Sulfate by Gravimetry; Quantitative Determination of Iron by Gravimetry; Quantitative Determination of Nickel by Gravimetry.

KİM221 (Eng) Analytical Chemistry Laboratory I 0+6 3.0

Separations in Groups of Cations with the Hydrogen Sulfide Method; Characteristic Reactions of First and Second Group Cations and their Separations; Characteristic Reactions of Third, Fourth and Fifth Group Cations and their Separations; Characteristic Reactions of First and Second Group Anions and their Separations; Characteristic Reactions of Third, Fourth and Fifth Group Anions and their Separations; Systematic Analysis of Cations and Anions in an Unknown Sample; Quantitative Determination of Sulfate by Gravimetry; Quantitative Determination of Iron by Gravimetry; Quantitative Determination of Nickel by Gravimetry.

KİM222 Analytical Chemistry Laboratory II 0+6 3.0

Quantitative Determination of Hydrochloric Acid by means of Volumetric Analysis; Quantitative Determination of Mixture of Sodium Carbonate-Sodium Hydrogencarbonate with Acid-Base Titration; Quantitative Determination of Borax by Acid-Base Titration; Quantitative Determination of Chloride via Precipitation Titration; The Determination of Iron via Oxidation-Reduction Titration Method; The Determination of Copper by means of Iodometric Titration Method; Determination of Water Hardness and the Determination of Zinc in Brass by Titration with EDTA; The Fusion Experiments in the Various Samples; Semi-quantitative Analyses in an Unknown Sample.

KİM222 (Eng) Analytical Chemistry Laboratory II 0+6 3.0

Quantitative Determination of Hydrochloric Acid by means of Volumetric Analysis; Quantitative Determination of Mixture of Sodium Carbonate-Sodium Hydrogencarbonate with Acid-Base Titration; Quantitative Determination of Borax by Acid-Base Titration; Quantitative Determination of Chloride via Precipitation Titration; The Determination of Iron via Oxidation-Reduction Titration Method; The Determination of Copper by means of Iodometric Titration Method; Determination of Water Hardness and the Determination of Zinc in Brass by Titration with EDTA; The Fusion Experiments in the Various Samples; Semi-quantitative Analyses in an Unknown Sample.

KİM240 Instrumental Analysis I 3+0 4.0

Characterization of Electromagnetic Radiation; Interaction of Electromagnetic Radiation and Electromagnetic Spectrum; Basic Principles of Spectroscopic Techniques; General Information on Components of Spectroscopic Instruments; The Factors that Influence the Band Width in Spectral Transition; Basic Principles of Atomic Spectroscopy; Emission and

Molecular Spectroscopy; Florimetric Methods; Intensity of Spectral Transition; Basic Principles of ICP; Basic Principles of X-Ray.

KİM257 Inorganic Chemistry I 4+0 5.0

SI Units; The structure of atom: Atom, The hydrogen atom and Bohr theory, Particle-wave character of electron, Heisenberg?s uncertainty principle, Quantum model and Schrödinger wave equation, Atoms with poly electrons, Pauli principle, Slater and Hund rule, Aufbau principle, Energy levels in atom; Periodic Properties of Elements: Size of atom and ion, Ionization energy, Electron affinity, Electro negativity; Introduction to Bonding in Chemistry: Ionic, Covalent bonds: Lewis formulas, Resonance; Metallic Bond: Covalent bond: Lewis theory, VBT, Hybridization, MOT and Combination of atomic orbital; Molecular geometry.SI Units; The structure of atom: Atom, The hydrogen atom and Bohr theory, Particle-wave character of electron, Heisenberg?s uncertainty principle, Quantum model and Schrödinger wave equation, Atoms with poly electrons, Pauli principle, Slater and Hund rule, Aufbau principle, Energy levels in atom; Periodic Properties of Elements: Size of atom and ion, Ionization energy, Electron affinity, Electro negativity; Introduction to Bonding in Chemistry: Ionic, Covalent bonds: Lewis formulas, Resonance; Metallic Bond: Covalent bond: Lewis theory, VBT, Hybridization, MOT and Combination of atomic orbital; Molecular geometry.

KİM257 (Eng) Inorganic Chemistry I 4+0 5.0

SI Units; The structure of atom: Atom, The hydrogen atom and Bohr theory, Particle-wave character of electron, Heisenberg?s uncertainty principle, Quantum model and Schrödinger wave equation, Atoms with poly electrons, Pauli principle, Slater and Hund rule, Aufbau principle, Energy levels in atom; Periodic Properties of Elements: Size of atom and ion, Ionization energy, Electron affinity, Electro negativity; Introduction to Bonding in Chemistry: Ionic, Covalent bonds: Lewis formulas, Resonance; Metallic Bond: Covalent bond: Lewis theory, VBT, Hybridization, MOT and Combination of atomic orbital; Molecular geometry.SI Units; The structure of atom: Atom, The hydrogen atom and Bohr theory, Particle-wave character of electron, Heisenberg?s uncertainty principle, Quantum model and Schrödinger wave equation, Atoms with poly electrons, Pauli principle, Slater and Hund rule, Aufbau principle, Energy levels in atom; Periodic Properties of Elements: Size of atom and ion, Ionization energy, Electron affinity, Electro negativity; Introduction to Bonding in Chemistry: Ionic, Covalent bonds: Lewis formulas, Resonance; Metallic Bond: Covalent bond: Lewis theory, VBT, Hybridization, MOT and Combination of atomic orbital; Molecular geometry.

KİM259 History of Chemistry 2+0 3.0

The evolution Stages of Science, Historical Writting of Chemistry, Chemistry Practicality B.C. and First Written Sources Regarding Chemistry, Chemistry rules B.C., Alchemy age, Before and After Lavoiser; The First Developments in Organic, Inorganic and Physicochemistry, Peryodic Table, Latest Developments in Atomism and Nuclear Chemistry, Arise of Chemistry Industry and Development of Chemistry Industry, Arise of Chemistry Industry and Development of Chemistry Industry in Turkey, Importance of Basic Sciences and Role in The development of Applied Sciences, Chemistry Industry and Freedom of Opinion of Science-Scientist, Nobel Prizes in Chemistry.

KİM275 Analytical Chemistry I 4+0 5.0

Basic Concepts in Analytical Chemistry; Errors in Chemical Analysis: Random errors in analysis; Statistical Evaluation of Analytical Data; Gravimetric Methods of Analysis: Properties of precipitates and precipitating reagents; Titrimetric Methods of Analysis: Properties of volumetric titrimetry; Aqueous-Solution Chemistry; Chemical Equilibrium; The Effect of Electrolytes on Ionic Equilibrium; Thermodynamic and Concentration Equilibrium Constants; Application of Multiple-Equilibrium of Equilibrium Calculations.Basic Concepts in Analytical Chemistry; Errors in Chemical Analysis: Random errors in analysis; Statistical Evaluation of Analytical Data; Gravimetric Methods of Analysis: Properties of precipitates and precipitating reagents; Titrimetric Methods of Analysis: Properties of volumetric titrimetry; Aqueous-Solution Chemistry; Chemical Equilibrium; The Effect of Electrolytes on Ionic Equilibrium; Thermodynamic and Concentration Equilibrium Constants; Application of Multiple-Equilibrium of Equilibrium Calculations.

KİM275 (Eng) Analytical Chemistry I 4+0 5.0

Basic Concepts in Analytical Chemistry; Errors in Chemical Analysis: Random errors in analysis; Statistical Evaluation of Analytical Data; Gravimetric Methods of Analysis: Properties of precipitates and precipitating reagents; Titrimetric Methods of Analysis: Properties of volumetric titrimetry; Aqueous-Solution Chemistry; Chemical Equilibrium; The Effect of Electrolytes on Ionic Equilibrium; Thermodynamic and Concentration Equilibrium Constants; Application of Multiple-Equilibrium of Equilibrium Calculations.Basic Concepts in Analytical Chemistry; Errors in Chemical Analysis: Random errors in analysis; Statistical Evaluation of Analytical Data; Gravimetric Methods of Analysis: Properties of precipitates and precipitating reagents; Titrimetric Methods of Analysis: Properties of volumetric titrimetry; Aqueous-Solution Chemistry; Chemical Equilibrium; The Effect of Electrolytes on Ionic Equilibrium; Thermodynamic and Concentration Equilibrium Constants; Application of Multiple-Equilibrium of Equilibrium Calculations.

KİM276 Analytical Chemistry II 4+0 5.0

Theory of Neutralization Titrations: Acid-base indicators; Titration Curves for Complex Acid-Base Systems: Poly-functional acids and bases; Applications of Neutralization Titrations; Precipitation Titrations; Complex Formation Titrations: Complex-Formation: Titrations with metals; An Introduction to Electrochemistry; Electrode Potentials;

Applications of Standard Electrode Potentials; Oxidation-Reduction Indicators; Applications of Oxidation-Reduction Titrations.Theory of Neutralization Titrations: Acid-base indicators; Titration Curves for Complex Acid-Base Systems: Poly-functional acids and bases; Applications of Neutralization Titrations; Precipitation Titrations; Complex Formation Titrations: Complex-Formation: Titrations with metals; An Introduction to Electrochemistry; Electrode Potentials; Applications of Standard Electrode Potentials; Oxidation-Reduction Indicators; Applications of Oxidation-Reduction Titrations.

KİM276 (Eng) Analytical Chemistry II 4+0 5.0

Theory of Neutralization Titrations: Acid-base indicators; Titration Curves for Complex Acid-Base Systems: Poly-functional acids and bases; Applications of Neutralization Titrations; Precipitation Titrations; Complex Formation Titrations: Complex-Formation: Titrations with metals; An Introduction to Electrochemistry; Electrode Potentials; Applications of Standard Electrode Potentials; Oxidation-Reduction Indicators; Applications of Oxidation-Reduction Titrations.Theory of Neutralization Titrations: Acid-base indicators; Titration Curves for Complex Acid-Base Systems: Poly-functional acids and bases; Applications of Neutralization Titrations; Precipitation Titrations; Complex Formation Titrations: Complex-Formation: Titrations with metals; An Introduction to Electrochemistry; Electrode Potentials; Applications of Standard Electrode Potentials; Oxidation-Reduction Indicators; Applications of Oxidation-Reduction Titrations.

KİM277 Organic Chemistry I 4+0 4.0

Structure and chemical bonding in organic molecules, covalent bonding and chemical reactivity, acids and bases in organic chemistry, unstable intermediates, the main types of reaction mechanisms in organic chemistry; Nomenclature of aliphatic hydrocarbons, physical and chemical properties of alkenes, conformation of the alkenes, synthesis and reactions of alkenes; Physical and chemical properties of alkenes, elimination reactions (E1 and E2) and synthesis of alkenes, other reactions of alkenes, structural properties and reactions of conjugated dienes; Physical and chemical properties, preparation and reactions of alkynes; Stereochemistry, chiral molecules and optical activity, absolute configuration, Fischer projections, molecules incorporating several stereo-centers, stereochemistry in chemical reactions, separation of enantiomers.Structure and chemical bonding in organic molecules, covalent bonding and chemical reactivity, acids and bases in organic chemistry, unstable intermediates, the main types of reaction mechanisms in organic chemistry; Nomenclature of aliphatic hydrocarbons, physical and chemical properties of alkenes, conformation of the alkenes, synthesis and reactions of alkenes; Physical and chemical properties of alkenes, elimination reactions (E1 and E2) and synthesis of alkenes, other reactions of alkenes, structural properties and reactions of conjugated dienes; Physical and chemical properties, preparation and reactions of alkynes; Stereochemistry, chiral molecules and optical activity, absolute configuration, Fischer projections, molecules incorporating several stereo-centers, stereochemistry in chemical reactions, separation of enantiomers.

KİM277 (Eng) Organic Chemistry I 4+0 4.0

Structure and chemical bonding in organic molecules, covalent bonding and chemical reactivity, acids and bases in organic chemistry, unstable intermediates, the main types of reaction mechanisms in organic chemistry; Nomenclature of aliphatic hydrocarbons, physical and chemical properties of alkenes, conformation of the alkenes, synthesis and reactions of alkenes; Physical and chemical properties of alkenes, elimination reactions (E1 and E2) and synthesis of alkenes, other reactions of alkenes, structural properties and reactions of conjugated dienes; Physical and chemical properties, preparation and reactions of alkynes; Stereochemistry, chiral molecules and optical activity, absolute configuration, Fischer projections, molecules incorporating several stereo-centers, stereochemistry in chemical reactions, separation of enantiomers.Structure and chemical bonding in organic molecules, covalent bonding and chemical reactivity, acids and bases in organic chemistry, unstable intermediates, the main types of reaction mechanisms in organic chemistry; Nomenclature of aliphatic hydrocarbons, physical and chemical properties of alkenes, conformation of the alkenes, synthesis and reactions of alkenes; Physical and chemical properties of alkenes, elimination reactions (E1 and E2) and synthesis of alkenes, other reactions of alkenes, structural properties and reactions of conjugated dienes; Physical and chemical properties, preparation and reactions of alkynes; Stereochemistry, chiral molecules and optical activity, absolute configuration, Fischer projections, molecules incorporating several stereo-centers, stereochemistry in chemical reactions, separation of enantiomers.

KİM278 Organic Chemistry II 4+0 5.0

Aromatic compounds and their nomenclature, structure and properties of benzene; Hückel?s rule and aromaticity; Electrophilic aromatic substitution reactions and synthesis of benzene derivatives; Physical and chemical properties of the alkyl halide and aryl halide compounds, nucleophilic substitution reactions (SN1 and SN2), synthesis and reactions of alkyl halides and aryl halides; Nomenclature, physical and chemical properties of alcohols and aryl alcohols, synthesis and reactions of alcohols; Structural properties, synthesis and reactions of thiols; Physical and chemical properties, nomenclature, synthesis and reactions of the ethers, epoxides and thio ethers; Physical and chemical properties, nomenclature, synthesis and reactions of the amines, nitro, nitroso, diazo and azo compounds.Aromatic compounds and their nomenclature, structure and properties of benzene; Hückel?s rule and aromaticity; Electrophilic aromatic substitution reactions and synthesis of benzene derivatives; Physical and chemical properties of the alkyl halide and aryl halide compounds, nucleophilic substitution reactions (SN1 and SN2), synthesis and reactions of alkyl halides and aryl halides; Nomenclature, physical and chemical properties of alcohols and aryl alcohols, synthesis and reactions of alcohols; Structural properties, synthesis and reactions of thiols; Physical and chemical properties, nomenclature, synthesis and reactions of the ethers, epoxides and thio ethers; Physical and chemical properties, nomenclature, synthesis and reactions of the amines, nitro, nitroso, diazo and azo compounds.

KİM278 (Eng) Organic Chemistry II 4+0 5.0

Aromatic compounds and their nomenclature, structure and properties of benzene; Hückel?s rule and aromaticity; Electrophilic aromatic substitution reactions and synthesis of benzene derivatives; Physical and chemical properties of the alkyl halide and aryl halide compounds, nucleophilic substitution reactions (SN1 and SN2), synthesis and reactions of alkyl halides and aryl halides; Nomenclature, physical and chemical properties of alcohols and aryl alcohols, synthesis and reactions of alcohols; Structural properties, synthesis and reactions of thiols; Physical and chemical properties, nomenclature, synthesis and reactions of the ethers, epoxides and thio ethers; Physical and chemical properties, nomenclature, synthesis and reactions of the amines, nitro, nitroso, diazo and azo compounds.Aromatic compounds and their nomenclature, structure and properties of benzene; Hückel?s rule and aromaticity; Electrophilic aromatic substitution reactions and synthesis of benzene derivatives; Physical and chemical properties of the alkyl halide and aryl halide compounds, nucleophilic substitution reactions (SN1 and SN2), synthesis and reactions of alkyl halides and aryl halides; Nomenclature, physical and chemical properties of alcohols and aryl alcohols, synthesis and reactions of alcohols; Structural properties, synthesis and reactions of thiols; Physical and chemical properties, nomenclature, synthesis and reactions of the ethers, epoxides and thio ethers; Physical and chemical properties, nomenclature, synthesis and reactions of the amines, nitro, nitroso, diazo and azo compounds.

KİM280 Glass Chemistry and Its Applications 2+1 3.0

General Properties of Glass: Definition, Physical properties of glass, Chemical properties of glass, Thermal properties of glass, Optical properties of glass; Glass Types: Non-oxide and oxide, Halogen glasses, Metallic glasses; Viscosity: Definition of viscosity, Measurement of viscosity, Effect of viscosity of the compound; Structure of Glass: Introduction to the structure of glass, Oxide and other glass structures; Phases: Phase diagrams, Phase separation, Effect of components of phase diagrams; Color Formation in Glasses.

KİM305 Water and Wastewater Analyses 2+0 3.0

Methods of Sampling and Sample Storage; Errors in Analytical Results; Accuracy of Analytical Results; Methods of Detection Limit; Reporting for Analytical Results; The Selection and Development of Analytical Methods; Determination of General Properties of Waters: Temperature, Taste, Color, Turbidity, Salinity, Conductivity, pH, Calcium carbonate saturation, Hardness; Analyses of metals: Sample pre-treatment techniques, Metal analyses by atomic absorption spectrometry, Metal analyses by plasma emission spectroscopy, Metal analyses by anodic stripping voltammetry.

KİM314 Textile Chemistry and Its Applications 1+2 3.0

General Properties of Textile Fibers: Polymerization, Inter-polymer forces of attraction, Fiber morphology; Classification of Textile Fibers: Natural fibers and their properties, Cellulosic fibers, Cotton, Viscose, acetate, protein fibers and their properties, Wool, silk, synthetic fibers and their properties, Nylon, Polyester; Dyeing and Printing: Theory of dyeing and printing, Dyes; Chemical Finishing of Textiles; Dyeing Textile Fibers: Dyeing cotton, Dyeing wool, Dyeing polyester, Dyeing polyester-cotton mixtures, Wash fastness test.

KİM315 The Chemistry of Ceramics 2+0 3.0

Introduction to Ceramics Materials; Raw Materials: Clay, Kaolin, Feldspars and others, Structure, Chemical properties of these raw materials; Preparation of raw materials; Suspension of ceramic materials in water: Slip and glaze viscosity, Zeta potential; Shaping methods, Slip cashang, Shaping in plastic state, Pressing, Extrusion and others; Drying and firing of ceramic ware; Fuels; Kilns; Glazes, Enamels and glass chemistry; Chemical properties of refractory materials.

KİM316 Drugs 2+0 3.0

Introduction to drug concept and history; Classification of drugs; Nomenclature: Chemical, Pharmacopeal and commercial; The principles of interaction between drugs and biopolymers; Concept of biofonctional and chemofonctional groups; The general methods on starting materials of drugs: some analgesic drugs and their properties; Penicillin group antibiotics and properties; Tranquilizer drugs and properties; Sulphanilamide chemotherapeutical and mechanism of activity; Some starting materials of drugs which can be produced in Turkey.

KİM318 The Extraordinary Chemistry of Ordinay Things 2+0 3.0

Atoms, Elements and Chemical Bonding; Energy, Medicine and Nuclear Calendar; The Power of Hydrocarbons; Petroleum; Acids and Bases; The Electricity of chemistry; The States of Matter; Surfactants; Chemicals, pollination and environment; Food, fats and oils; Proteins and The Chemistry of Life; Minerals, vitamins and additives; Cosmetics; Medicine and Drugs.

KİM321 Organic Chemistry Laboratory I 0+4 4.0

Crystallization of Benzoic Acid; Sublimation of Naphthalene; Extraction Based on Chemical Reactions; Continuous Extraction with Solvents Less Dense than Water; Continuous Extraction with Solvents Denser than water; Continuous Extraction with Soxhlet Extractor; Simple Distillation; Fractional Distillation; Vacuum Distillation; Steam Distillation; Thin Layer Chromatography; Paper Chromatography; Colon Chromatography; Nucleophilic Substitution Reactions (Synthesis

of N-Butyl Bromide from N-Butanol); Elimination Reactions (Synthesis of 1-Hexene from 1-Hexanol); Instauration and Trans Electrophilic Addition (Synthesis of 1,2-Dibromohexane from 1-Hexanol).

KİM321 (Eng) Organic Chemistry Laboratory I 0+4 4.0

Crystallization of Benzoic Acid; Sublimation of Naphthalene; Extraction Based on Chemical Reactions; Continuous Extraction with Solvents Less Dense than Water; Continuous Extraction with Solvents Denser than water; Continuous Extraction with Soxhlet Extractor; Simple Distillation; Fractional Distillation; Vacuum Distillation; Steam Distillation; Thin Layer Chromatography; Paper Chromatography; Colon Chromatography; Nucleophilic Substitution Reactions (Synthesis of N-Butyl Bromide from N-Butanol); Elimination Reactions (Synthesis of 1-Hexene from 1-Hexanol); Instauration and Trans Electrophilic Addition (Synthesis of 1,2-Dibromohexane from 1-Hexanol).

KİM322 Organic Chamistry Laboratory II 0+4 4.0

Catalytic Hydrogenation Reactions: Synthesis of aniline from nitrobenzene; Synthesis of Diazonium Salts: Synthesis of phenol from diazonium salts, Synthesis of sromobenzen from diazonium salts, Synthesis of azo dyes from diazonium salts; Esterification Reactions: Synthesis of ethyl benzoate from benzoic acid; Cannizaro Reactions: Synthesis of benzyl alcohol and benzoic acid from benzaldehyde; Research Experiments; Qualitative Organic Analysis; Sodium Fusion; Elementary Analysis; Solubility Tests; Functional Group Analysis.

KİM322 (Eng) Organic Chemistry Laboratory II 0+4 4.0

Catalytic Hydrogenation Reactions: Synthesis of aniline from nitrobenzene; Synthesis of Diazonium Salts: Synthesis of phenol from diazonium salts, Synthesis of sromobenzen from diazonium salts, Synthesis of azo dyes from diazonium salts; Esterification Reactions: Synthesis of ethyl benzoate from benzoic acid; Cannizaro Reactions: Synthesis of benzyl alcohol and benzoic acid from benzaldehyde; Research Experiments; Qualitative Organic Analysis; Sodium Fusion; Elementary Analysis; Solubility Tests; Functional Group Analysis.

KİM324 Physical Chemistry Laboratory I 0+3 4.0

Gases: The PVT Behavior and equation of state for ideal gas; Thermo chemistry: Determination of the enthalpy of neutralization; Colligative Properties: Determination of molar mass; Partial Molar Quantities: Partial molar volume; Viscosity: Viscosity measurements of liquids, Determining the molecular weight of a polymer from intrinsic viscosity measurement; Interfacial Chemistry: Determination of surface tension of liquids, Adsorption of liquids at solid surfaces; Phase Equilibrium and Diagrams: Solubility diagram of two partially mixing liquids, construction of phase diagram of a three-component system, Boiling point diagram of a binary mixture, Melting point diagram of a binary mixture.

KİM325 Inorganic Chemistry Laboratory I 0+3 4.0

Synthesis of Some Basic Ionic Compounds, Metal Oxides, Zwitter Salts and Covalent Compounds and Determination Experiment of Specific Characteristics of them by Gravimetric, Volumetric and Conduct metric Methods; Oxides: Chromium (III) oxide, Copper (I) oxide, Calcium peroxide 0,4 and 8 hydrate, di-Iodine pentaoxide; Salts: Tin (II) chloride dehydrate and anhydrous, Ammonium permanganate, Potassium monochloro chromate, Sodium tiosulfate, Lead iodine, Magnesium sulfate heptahydrate; Covalent Compounds: Tin(IV) iodine, Barium bromide, Iron (II) oxalate, Copper (I) iodide, Boron acetate.

KİM325 (Eng) Inorganic Chemistry Laboratory I 0+3 4.0

Synthesis of Some Basic Ionic Compounds, Metal Oxides, Zwitter Salts and Covalent Compounds and Determination Experiment of Specific Characteristics of them by Gravimetric, Volumetric and Conduct metric Methods; Oxides: Chromium (III) oxide, Copper (I) oxide, Calcium peroxide 0,4 and 8 hydrate, di-Iodine pentaoxide; Salts: Tin (II) chloride dehydrate and anhydrous, Ammonium permanganate, Potassium monochloro chromate, Sodium tiosulfate, Lead iodine, Magnesium sulfate heptahydrate; Covalent Compounds: Tin(IV) iodine, Barium bromide, Iron (II) oxalate, Copper (I) iodide, Boron acetate.

KİM326 Inorganic Chemistry Laboratory II 0+3 4.0

Synthesis of Some Basic Coordination Compounds and Inorganic Acids and Determination of Specific Characteristics of them with Gravimetric, Volumetric, Conductometric, Magnetic and Spectroscopic Method; Acids: Amino ethane sulfonic acid, Iodic acid; Coordination Compounds: Tetra amine copper (II) sulfate, Hexamine cobalt (III) chloride, cis-Potassium dioxalato diaqua chromate (III), Potassium tri oxalato aluminate, Hexamine nickel (II) chlorine, Barium ferrate, Potassium dioxalato dihydroxo manganate, Sodium hegzanitro cobaltite, trans-potassium dioxalato dicaqua chromate (III).

KİM326 (Eng) Inorganic Chemistry Laboratory II 0+3 4.0

Synthesis of Some Basic Coordination Compounds and Inorganic Acids and Determination of Specific Characteristics of them with Gravimetric, Volumetric, Conductometric, Magnetic and Spectroscopic Method; Acids: Amino ethane sulfonic acid, Iodic acid; Coordination Compounds: Tetra amine copper (II) sulfate, Hexamine cobalt (III) chloride, cis-Potassium dioxalato diaqua chromate (III), Potassium tri oxalato aluminate, Hexamine nickel (II) chlorine, Barium ferrate, Potassium dioxalato dihydroxo manganate, Sodium hegzanitro cobaltite, trans-potassium dioxalato dicaqua chromate (III).

KİM331 Analysis Methods in Atomic Absorption 1+2 3.0

Basic principles of the atomic absorption spectroscopy; Some applications of atomic absorption spectroscopy in foods: Quantitative determination of metals in fruit juice, tea, coffee and milk. Some applications of atomic absorption spectroscopy in pharmacy: Quantitative determination of lead in cosmetics, Quantitative determination of aluminum in pharmaceuticals; Some industrial applications of atomic absorption spectroscopy: Quantitative determination of copper in textile fabrics, Quantitative determination of potassium in fertilizers; Analysis of metals in natural water by atomic absorption spectroscopy.

KİM334 Inorganic Chemistry II 4+0 5.0

Solids: Crystal structure and calculation of Avogadro number, Ionic solids, Radius ratio, Lattice energy, Born-Haber cycle; Metals: Physical properties, Bonding theories in metals, Conductivity; Covalent Solids; Molecular Solids: Intermolecular forces: Vander Waals, London, Repulsion forces, Hydrogen bond; Acids and Bases: Classical approach, Lewis definition, Hard-Soft Acid-Base concept; Coordination compounds: Werner Theory, Nomenclature of C.C., Isomers, EAN rule, VB, MO Theories; Magnetic properties of coordination compounds; Ligands.

KİM334 (Eng) Inorganic Chemistry II 4+0 5.0

Solids: Crystal structure and calculation of Avogadro number, Ionic solids, Radius ratio, Lattice energy, Born-Haber cycle; Metals: Physical properties, Bonding theories in metals, Conductivity; Covalent Solids; Molecular Solids: Intermolecular forces: Vander Waals, London, Repulsion forces, Hydrogen bond; Acids and Bases: Classical approach, Lewis definition, Hard-Soft Acid-Base concept; Coordination compounds: Werner Theory, Nomenclature of C.C., Isomers, EAN rule, VB, MO Theories; Magnetic properties of coordination compounds; Ligands.

KİM336 Surface and Thermal Analysis Methods 1+2 3.0

Determination of Surface Area; Determination of Micro, Meso and Macro Pore Sizes; Determination of Particle Size; Zeta Potential; Isoelectronic Point; Atomic Force Microscope; Scanning Tunneling Microscope; Determination of Surface Properties; Thermal Analysis; Thermal gravimetric analysis, Differential thermal analysis, Differential scanning calorimetry; Thermal Stability; Thermal Properties; Thermal Decomposition.

KİM337 Organic Chemistry III 4+0 6.0

Physical and chemical properties of carbonyl compounds, nomenclature of aldehydes and ketones, preparation of aldehydes and ketones, nucleophilic addition to aldehydes and ketones and condensation reactions, reactions of ?,?-unsaturated aldehydes and ketones; Physical and chemical properties, preparation of carboxylic acids and derivatives, reactivity of the carboxy group and the mechanism of addition-elimination reactions, transformation of the carboxylic acids into acyl halides, anhydride, ester and amide derivatives and other reactions, preparations and reactions of carbamic acid, urea and carbamates; Structural properties and reactions of nitriles, isonitriles and cyanates; Structural properties and nomenclature of heterocylic compounds, reactions of aromatic heterocyclic compounds; Pericyclic chemistry.Physical and chemical properties of carbonyl compounds, nomenclature of aldehydes and ketones, preparation of aldehydes and ketones, nucleophilic addition to aldehydes and ketones and condensation reactions, reactions of ?,?-unsaturated aldehydes and ketones; Physical and chemical properties, preparation of carboxylic acids and derivatives, reactivity of the carboxy group and the mechanism of addition-elimination reactions, transformation of the carboxylic acids into acyl halides, anhydride, ester and amide derivatives and other reactions, preparations and reactions of carbamic acid, urea and carbamates; Structural properties and reactions of nitriles, isonitriles and cyanates; Structural properties and nomenclature of heterocylic compounds, reactions of aromatic heterocyclic compounds; Pericyclic chemistry.

KİM337 (Eng) Organic Chemistry III 4+0 6.0

Physical and chemical properties of carbonyl compounds, nomenclature of aldehydes and ketones, preparation of aldehydes and ketones, nucleophilic addition to aldehydes and ketones and condensation reactions, reactions of ?,?-unsaturated aldehydes and ketones; Physical and chemical properties, preparation of carboxylic acids and derivatives, reactivity of the carboxy group and the mechanism of addition-elimination reactions, transformation of the carboxylic acids into acyl halides, anhydride, ester and amide derivatives and other reactions, preparations and reactions of carbamic acid, urea and carbamates; Structural properties and reactions of nitriles, isonitriles and cyanates; Structural properties and nomenclature of heterocylic compounds, reactions of aromatic heterocyclic compounds; Pericyclic chemistry.Physical and chemical properties of carbonyl compounds, nomenclature of aldehydes and ketones, preparation of aldehydes and ketones, nucleophilic addition to aldehydes and ketones and condensation reactions, reactions of ?,?-unsaturated aldehydes and ketones; Physical and chemical properties, preparation of carboxylic acids and derivatives, reactivity of the carboxy group and the mechanism of addition-elimination reactions, transformation of the carboxylic acids into acyl halides, anhydride, ester and amide derivatives and other reactions, preparations and reactions of carbamic acid, urea and carbamates; Structural properties and reactions of nitriles, isonitriles and cyanates; Structural properties and nomenclature of heterocylic compounds, reactions of aromatic heterocyclic compounds; Pericyclic chemistry.

KİM338 X-Ray Diffraction Analysis Techniques 1+2 3.0

Theory of X-Ray Diffraction and Identification of Molecular Structure; Principles of Single Crystal X-Ray Diffraction and Using X-Ray Diffraction Machine; Solid State Chemistry and Types of Crystals; Transition Metal Complexes and Techniques of Metal Complex Synthesis; Techniques of Coordination Polymers Synthesis: Crystallization techniques, data collection and structure solving of sample molecules from diffractometer.

KİM339 Inorganic Technologies 2+0 3.0

Industrial raw materials. Preparation and separation of raw materials. Industrial wastes. Industrial gases. Synthesis methods of sulfuric acid, nitric acid, phosphoric acid and hydrochloric acid and applications. Classification of mineral fertilizers. Important compounds of boron and production. Synthesis methods of ammonia and applications. Types and production of glass. Types and characteristics of cement. Production of iron and steel. Production and usage of aluminum.

KİM341 Green Organic Chemistry 2+0 3.0

Introduction to Green Chemistry; Ionic Liquids: Historical background and synthesis, Physical properties, Applications as reaction media, The future of ionic liquids; Fluorous Solvents: Physical properties, Applications as reaction media, Enantioselective catalysts for fluorous biphasic systems, Heavy fluorous reagents, Light fluorous compounds and fluorous silica gel, Fluorous reactions in supercritical carbon dioxide; Supercritical Carbon Dioxide: Physical properties, Applications as reaction media, Synthesis and separation, Experimental methods.

KİM343 Instrumental Analysis II 3+0 4.0

UV-VIS (Ultraviolet-Visible) Spectroscopy: Absorption of ultraviolet region and electronic excitation, Types of electronic transition; Inter-intra factors affecting absorption band shifting, factors affecting band intensitives, Steric and other effects; Applications of UV spectroscopy, IR Spectroscopy: Absorption on infrared region, Types of infrared bands, Vibration types, Infrared spectrometer, Infrared absorption regions, Factors affecting infrared spectrum, Applications of IR spectroscopy; Theory of Nuclear Magnetic Resonance.

KİM345 Physical Chemistry I 3+0 5.0

Properties of Gases: The ideal gas, Imperfect gases, nonideal beheviour and equation of state; The kinetic Theory of Ğases; The First Law of Thermodynamics: Reversible and irreversible processes, Internal energy function, Enthalpy function, Dependence of internal energy and enthalpy on pressure, volume and temperature, Isothermal and adiabatic processes; The Second Law of Thermodynamics: Entropy, Entropy change in the system, surroundings and universe, The Carnot cycle, Absolute entropies; The Third Law of Thermodynamics; Thermochemistry: Internal energy and enthalpy changes in chemical reactions, Hess law, Temperature dependence of heats of reactions.

KİM346 Physical Chemistry II 3+0 5.0

Free Energy and Chemical Equilibria: Gibbs and Helmholtz functions, Dependence of the free energy on pressure, Quantitative relation between standard Gibbs free energy and the equilibrium constant, Temperature dependence of the free energy and the equilibrium constant of a reaction, Fugacity; The Thermodynamic Treatment of Multicomponent Systems: The thermodynamics of mixing, The ideal and nonideal solutions, Chemical potantial, Activity, Partial molar quantities, Colligative properties; Surfaces and Processes at Interfaces; Phase Equilibria and Diagrams: Phase rule, Phase diagrams for one-, two- and three-component systems.

KİM347 Food Chemistry and Technology 2+0 3.0

Chemical Composition of Foods: Water, Amino acids and proteins, Enzymes, Lipids, Carbohydrates, Vitamins and minerals; Aroma Compounds; Food Additives; Food Contaminations; Milk and Dairy Products; Eggs, Meat and Fish; Edible Oils: Fats and oils; Cereals and Cereal Products; Legumes; Vegetables and Vegetable Products; Fruits and Fruit Products; Sugars: Sugar alcohols and honey; Alcoholic Beverages; Coffee, Tea, Cocoa; Spices; Salt and Vinegar; Drinking Water: Mineral and table water; Analysis of Food Components, Quality and safety controls; Food Storage Techniques; International Food Laws; European, USA and Turkish Food Codecs.

KİM348 Colour Chemistry and Synthesis Methods 2+0 3.0

Physical and Chemical Basis of The Colour; Synthesis of Azo Dyes and Pigments; Synthesis of Carbonyl Dyes and Pigments; Synthesis of Phthalocyanines; Synthesis of Textile Dyes; Synthesis of Reactive Dyes For Textile Fibres; Synthesis of Functional Dyes or Advanced Technology; Synthesis of Inorganic Pigments; Organic Pigment Synthesis; Special Pigments Synthesis; Colour and The Environment; Comparison of Synthetic and Natural Dyes Substances; Substances and colours of natural dyes; Future Colour and Dyes.

KİM349 Structure Characterization of Organic Compounds 2+0 3.0

Importance of Structure Characterization in Organic Compounds; Separation and Purification Processes in Organic Compounds; Determination of the Physical Properties; General Principle of Elemental Analysis, Ultraviolet (UV), Infrared (IR), Nuclear magnetic resonance (NMR) and Mass Spectroscopy methods in organic compounds; Interpretation of NMR, IR and UV Spectra; Structure Characterization of Selected Special Samples by NMR, IR, UV, Mass Spectroscopy and Element Analysis Techniques; Structure Characterization for an Unknown Sample.

KİM350 Introduction to Stereochemistry 2+0 3.0

Classification of Isomers; Stereoisomers; Chirality; Chirality in Molecules; Chiral Carbons; Symmetry Plane; (R), (S), Naming System; Cahn-Ingold-Prelogin Rules; Characteristics of the two Enantiomers; Optical Activity; Racemic Mixtures; Racemic Product; Optical Purity; Chiral conformers; Fischer Rules; Diastereomers; Two or More Chiral Carbon; Fischer-Rosanoff Convection; Determination of D and L; Diastereomers Features; Separation of Enantiomers; Basic Concepts of Stereochemistry.

KİM353 Laboratory Accreditation 2+0 3.0

Basic Concepts of Accreditation; Importance of Accreditation in Quality Management Systems; International Accreditation Associations; Accreditation Programs; Targets of Accreditation; Accreditation Standards; Standards of Experiment and Calibration Laboratories Accreditation (TS EN ISO 17025); Accreditation Period of Laboratories; Management Conditions; Technical Requirements; Target Group.

KİM354 Food Safety and Management Systems 2+0 3.0

Food Safety: Nutritional health, Food hygiene, Food-borne health risks; Management Systems Used in the Food Industry: ISO 22000, FSSC 22000 (ISO 22002-1), BRC, IFS; Good Manufacturing Practices and Conditions Required: GMP/GHP, HACCP, Pest control, Hazard analysis, Cleaning and disinfection in food business; Food Safety Inspection and Auditor Behavior: Control methods and standards, Food safety controls, Auditor qualifications and behavior.

KİM355 Hazardous Materials of Chemical and Safety I 2+0 3.0

Classification: Principles of classification, Classification of substances and mixtures, Classification of samples; Class Specific Provisions: Explosive substances and articles, Gases, Flammable liquids, Flammable solids, Self-reactive substances and solid desensitized explosive, Substances liable to spontaneous combustion, Substances which, in contact with water, emit flammable gases, Oxidizing substances, Organic peroxides, Toxic substances, Infectious substances, Radioactive material, Corrosive substances, Miscellaneous dangerous substances and articles.

KİM356 Hazardous Materials of Chemical and Safety II 2+0 3.0

Special Provision: Dangerous goods list, special provisions and exemptions releated to limited and excepted quantities; Packing and Tank Provisions; Consignment Procedures: General provisions, Marking and labelling, Documentation; Provisions Concerning The Conditions of Carriage, Loading, Unloading and Handling: Provisions concerning carriage in packages, Provisions concerning carriage in bulk, Provisions concerning carriage in tank, Provisions concerning loading, unloading and handling; Transport Restrictions by The Competent Authorities: Tunnel restrictions.

KİM357 Introduction to Adsorption 2+0 3.0

Adsorption: Types of adsorption, Adsorption forces, Physical and chemical adsorption, Adsorption heats, Factors affecting adsorption; Measurement of the Amount of Adsorption; Adsorbent Properties and Types; Adsorption Isotherms: Langmuir adsorption isotherm, Freundlich adsorption isotherm, BET adsorption isotherm; Adsorption Kinetics; Adsorption Thermodynamics; Applications of Adsorption in the Industries.

KİM358 Instrumental Analysis III 4+0 4.0

1H-NMR Spectroscopy: Chemical Shift and Chemical Factors Affecting Slipping, Spin-Spin Interaction Types and Factors Affecting the Interactions, Current Basic Rules of a proton Interaction with different protons, Second Order Spectra; 13C NMR spectroscopy: Help with 13C NMR Spectroscopy NMR Spectroscopy Structural Analysis; Fundamentals of ESR spectroscopy; Mass Spectrometry: Mass spectra and peak types, molecular ion peak, isotope peaks, Part stable peaks. Chromatography: Basic principles of chromatography, gas, high performance liquid and supercritical fluid chromatography; Electrophoresis: Capillary Electrophoresis and Capillary Chromatography.1H-NMR Spectroscopy: Chemical Shift and Chemical Factors Affecting Slipping, Spin-Spin Interaction Types and Factors Affecting the Interactions, Current Basic Rules of a proton Interaction with different protons, Second Order Spectra; 13C NMR spectroscopy: Help with 13C NMR Spectroscopy NMR Spectroscopy Structural Analysis; Fundamentals of ESR spectroscopy; Mass Spectrometry: Mass spectra and peak types, molecular ion peak, isotope peaks, Part stable peaks. Chromatography: Basic principles of chromatography, gas, high performance liquid and supercritical fluid chromatography; Electrophoresis: Capillary Electrophoresis and Capillary Chromatography.

KİM358 (Eng) Instrumental Analysis III 4+0 4.0

1H-NMR Spectroscopy: Chemical Shift and Chemical Factors Affecting Slipping, Spin-Spin Interaction Types and Factors Affecting the Interactions, Current Basic Rules of a proton Interaction with different protons, Second Order Spectra; 13C NMR spectroscopy: Help with 13C NMR Spectroscopy NMR Spectroscopy Structural Analysis; Fundamentals of ESR spectroscopy; Mass Spectrometry: Mass spectra and peak types, molecular ion peak, isotope peaks, Part stable peaks. Chromatography: Basic principles of chromatography, gas, high performance liquid and supercritical fluid chromatography; Electrophoresis: Capillary Electrophoresis and Capillary Chromatography.1H-NMR Spectroscopy: Chemical Shift and Chemical Factors Affecting Slipping, Spin-Spin Interaction Types and Factors Affecting the Interactions, Current Basic

Rules of a proton Interaction with different protons, Second Order Spectra; 13C NMR spectroscopy: Help with 13C NMR Spectroscopy NMR Spectroscopy Structural Analysis; Fundamentals of ESR spectroscopy; Mass Spectrometry: Mass spectra and peak types, molecular ion peak, isotope peaks, Part stable peaks. Chromatography: Basic principles of chromatography, gas, high performance liquid and supercritical fluid chromatography; Electrophoresis: Capillary Electrophoresis and Capillary Chromatography.

KİM359 Literature Searching 1+0 1.0

Ethic in Science: Concept of ethics, Ethical rules related to scientific research and publications; Types of Publications and Science Citation Indexes; Library Use; Using Chemical Drawing Program (ChemOffice); Use of Chemical Abstract Service (CAS) and SciFinder Program; Searching through SciFinder; Access to Publications via SciFinder; Searching through Internet Search Engines; Searching Through Web Pages of Publishers; Use of YÖK Documentation and ULAKBİM Systems; Types of Scientific Reports and Plagiarism Prevention Programs (iThenticate and Turnitin); The Main Sections in Reporting; Referencing in Reports; Referencing by EndNote Program.

KİM360 Introduction to Polymer Chemistry 2+0 3.0

Basic Concepts for Polymers and Polymer Chemistry; Classification of Polymers; Molecular Weight of Polymers; Methods for Molecular Weight Determination of Polymers; Stereochemistry of Polymers; Polymer Morphology and Thermal Behavior; Step-reaction Polymerization; Addition Polymerization; Copolymerization and Other Polymerization Techniques; Physical and Mechanical Properties of Polymers; Functional Polymers.

KİM401 Biochemistry I 3+0 3.0

Organization in Living Organisms; Types of Cells and Their Differences; Functions of Basic Organelles; Functions of Bioelements; Amino Acids, Structures and Main Reactions; Main Natural Peptides and Functions; Classification of Proteins; Natural Defense Proteins; Enzymes and Cofactors; Nucleotides; Nucleic Acids; Structure and Types of RNA; Primary, Secondary, Tertiary Structure and Functions of DNA; Recombinant DNA Technology; Carbohydrates, Derivatives and Basic Reactions.

KİM401 (Eng) Biochemistry I 3+0 3.0

Organization in Living Organisms; Types of Cells and Their Differences; Functions of Basic Organelles; Functions of Bioelements; Amino Acids, Structures and Main Reactions; Main Natural Peptides and Functions; Classification of Proteins; Natural Defense Proteins; Enzymes and Cofactors; Nucleotides; Nucleic Acids; Structure and Types of RNA; Primary, Secondary, Tertiary Structure and Functions of DNA; Recombinant DNA Technology; Carbohydrates, Derivatives and Basic Reactions.

KİM402 Biochemistry II 3+0 3.0

Fatty Acids and General Properties; Simple Lipids, Types and Functions; Compound Lipids, Types and Functions; Main Carotenoids and Functions; Main Steroids and Functions; Lipid Vitamins and Functions; Biomembranes and Their Structures; Active and Passive Transport in Biomembranes and Membrane Receptors; Energy Yielding and Requiring Processes in Living Organisms and High-Energy Biomolecules; Carbohydrate Metabolism; Citric Acid Cycle; Oxidative Phosphorylation; Anabolic and Catabolic Reactions of Fatty Acids; Protein Synthesis and Role of DNA and RNA in this Synthesis.

KİM402 (Eng) Biochemistry II 3+0 3.0

Fatty Acids and General Properties; Simple Lipids, Types and Functions; Compound Lipids, Types and Functions; Main Carotenoids and Functions; Main Steroids and Functions; Lipid Vitamins and Functions; Biomembranes and Their Structures; Active and Passive Transport in Biomembranes and Membrane Receptors; Energy Yielding and Requiring Processes in Living Organisms and High-Energy Biomolecules; Carbohydrate Metabolism; Citric Acid Cycle; Oxidative Phosphorylation; Anabolic and Catabolic Reactions of Fatty Acids; Protein Synthesis and Role of DNA and RNA in this Synthesis.

KİM408 Atom and Molecular Chemistry 2+0 2.0

The Structure of Atom: The Charge/Mass Ratio of the Electron, Millikan's Experiment and Determination of the mass and the charge of the Electron, the Energy of a Moving Electron, the Rutherford Experiment, the atomic size, Radioactivity, the Nucleus and It's Fundamental Particles, Radioactive Decay, Formation of the Nuclei and the Transformation of the Mass and the Energy, Energy from Nuclear Reactions, Some Applications of the Radioactivity, the Theory of Quantum and Wave Mechanics, Black Body Radiation, Photoelectric Effect, the Compton Effect, The Wave and Particle Natures of Light, the Schrödinger Equation, the Fime-Independent Schrödinger Equation, the Physical Meaning of (x,y,z) Function, Chemical Bonding, Atomical Orbitals and Hybridization, Molecular Orbitals.

KİM409 Chemistry in Industry 3+0 4.0

Basic Chemical Introduction: Continue and Batch processes, Chemical process economy, Market evaluation, Research and development, What is mass balance and purpose of mass balance, Examples; Water Technology; Energy and Fuels; Coal

Technology; Industrial Gases; Chlorine-Alkali Industries; Nitrogen Industries; Sulfur and Sulfuric acid; Hydrochloric acid and Various Inorganic Chemical Substances; Sugar and starch Industries. Energy and Energy Balances; Heat Transfer; Petroleum Refining; Petrochemical Materials and Chemical Transformations: Alkylation, Amination, Halogenation and Hydrohalogenation; Polymer Technology: Plastic, Synthetic fibres and rubbers, Liquid and solid oils: Refining and Hydrogenation; Soap and Detergents; Fermentation Industries; Agriculture Chemical Material Industries; Tasting and flavoring materials: Food additive industries; Cement Industries

KİM412 Biochemistry Laboratory 0+3 3.0

Microscopic Observation of Different Cells; Observation of Some Properties of Amino Acids and Proteins; The Bradford Test for Blood Protein; Protein Electrophoresis; Some Factors Affecting The Activity of ?-Amylase; Determination of Catalase Activity; Qualitative and Quantitative Carbohydrate Determinations; Anaerobic Glycolysis; Determination of Glucose in Urine; Qualitative and Quantitative Lipid Determinations; Determination of Serum Calcium; Determination of Ascorbic Acid; Dna Isolation and Purification; Chromatographic Techniques: Affinity chromatography applications.

KİM415 Introduction to Heterocyclic Chemistry 2+0 3.0

Nomenclature, Aromatic heterocyclic compounds, Nonaromatic heterocyclic compounds, Synthesis, of Three and four membered heterocyclic compounds, Compounds with one heteroatom in a five membered ring, Compounds with one heteroatom in a six membered ring, Two or more heteroatoms in a five membered rings, Two or more heteroatoms in a six membered rings, Seven membered heterocyclic compounds.

KİM419 Dyestuff Chemistry 2+0 3.0

General Characteristics of Dyestuffs; Fiber Species and Its Characteristics; Natural Dyestuffs; Classification of Dyestuffs as Inorganic and Organic Dyestuffs; Chemical and Physical Characteristics of Dyestuffs; Synthesis of Inorganic Dyestuffs; Synthesis of Organic Dyestuff; Azo Dyestuff a Thion: Dyestuffs; Reactions of dyestuff with Dyeing Fiber.

KİM423 Industrial Chemical Laboratory 0+4 3.0

Production of Inorganic and Organic Industrial Materials: Soap; Water Analyses: Removing of water hardness by Soda-Lime and Ion exchange processes; Coal Analysis: Improving of coal qualification; Coal Tar Analysis: Distillated oil, Phenol; Petroleum Analysis, Determination of aniline point, Production of petroleum; Application of Mass-Energy balances in distillation system; Vegetable Oil Analyses; Iodine number, Determination of Free acid analysis, Saponification number; Polymer Synthesis: Aniline-formaldehyde resin; ORSAD gas analyses: CO2, O2,CO; Determination of nitrogen by Kjeldahl method.

KİM425 Physical Chemistry Laboratory II 0+3 3.0

Chemical Kinetics: Determination of the formation constant of a complex, Halogen exchange rate, Determination of kinetics of a reaction using extinction measurement; the Nature of Electrolytes in Solution and Conductivity: Determination of activity coefficient by conductivity measurement, Temperature and concentration dependence of conductivity; Dissociation Equilibria: Determination of equilibrium constant; Electrochemical Cells: Determination of electromotive force, the Nernst equation, Potentiometric titration; Electrolysis: Electrolysis of water, Determination of Faraday's constant.

KİM425 (Eng) Physical Chemistry Laboratory II 0+3 3.0

Chemical Kinetics: Determination of the formation constant of a complex, Halogen exchange rate, Determination of kinetics of a reaction using extinction measurement; the Nature of Electrolytes in Solution and Conductivity: Determination of activity coefficient by conductivity measurement, Temperature and concentration dependence of conductivity; Dissociation Equilibria: Determination of equilibrium constant; Electrochemical Cells: Determination of electromotive force, the Nernst equation, Potentiometric titration; Electrolysis: Electrolysis of water, Determination of Faraday's constant.

KİM427 Analysis Techniques in Gas Chromatografi 1+2 3.0

Fundamental Principles of Gas Chromatography; Injection Systems; Columns: Types of columns, Column Materials; Detectors: Flame ionization dedector, Electron capture dedector, Thermal conductivity dedector, N-P dedector, Mass spectrometer; Analysis: Selecting and preparation of samples, Method development for temperature and pressure programming, Qualitative analysis, Quantitative analysis, Structural analysis with mass spectrometer.

KİM429 Chemistry of Main Group Elements 2+0 3.0

The General Properties of Main Group Elements: Physical and chemical properties, Electronegativity, Ionization energy; The Chemistry of Hydrogen; The Chemistry of Alkali Metals; occurence, physical and chemical properties, compounds of alkali metals; The Chemistry of IIA Group Elements; occurance, physical and chemical properties, compounds of group elements; The Chemistry of IIIA, IVA, VA, VIA ve VII Group Elements; occurance, physical and chemical properties, compounds of the group elements; The Chemistry of Halojens: occurance, physical and chemical properties, compounds of halojens.

KİM430 Biotechnological Methods 2+0 3.0

Description of Biotechnology; Importance of Biotechnology; Biotechnology in Turkey and world; Politics of Biotechnology in world; Plant technology, Use of biotechnology in production of vegetables fruits and oil seeds and plants including biological active matter; Biological methods applied for food industry production; Cleanliness of industrial effluents and waste water with biological methods; Future applications of Biotechnology.

KİM432 Organic Synthesis 2+0 3.0

Synthesis by oxidation of organic compounds, synthesis by reduction of organic compounds, uses of organometallic compounds in organic synthesis, uses of phosphorus compound in organic synthesis, uses of boron compounds in organic synthesis, uses of silicone compounds in organic synthesis, uses of carbonium, acil cation and acil anions in organic synthesis.

KİM433 The Seperation Techniques in Inorganic Chemistry 2+0 3.0

Separation Techniques; TLC (Thin Layer Chromatography); Column Chromatography; Crystallization; Use of TLC Method to Follow Reactions and Determine the Product Distribution; Isolation and Purification of Products by Using Column Chromatography Methods; Crystallization of the Compounds via some Chemical Techniques; Thermal Decomposition Analysis of the Synthesized Materials by Using TGA-DTA (thermo gravimetric analysis-diffential thermo gravimetric analysis).

KİM434 Coordination Chemistry 2+0 3.0

Coordination Compounds: Nomenclatures of coordination compounds, Transition metals, Magnetic properties, Coordination geometries, Ligands, Coordination numbers, Werner theory, Geometric isomerism and nomenclatures; Covalent Bond and Hybridization; Effective Atomic Number Theory: Werner complexes; Valance Band Theory: Octahedral, tetrahedral and square-planar complexes, Electro neutrality principle and ?'bonding; Electrostatic and Crystal Field Theory: Splitting of crystal field, 10 Dq energy, Weak field and strong field complexes, Tetrahedral, cubic and octahedral complexes, Chelate complexes, Jahn Tever theorem; Molecular orbital Theory (MOT): Investigation of simple and complex molecules, d orbits, Octahedral and tetrahedral complexes.

KİM434 (Eng) Coordination Chemistry 2+0 3.0

Coordination Compounds: Nomenclatures of coordination compounds, Transition metals, Magnetic properties, Coordination geometries, Ligands, Coordination numbers, Werner theory, Geometric isomerism and nomenclatures; Covalent Bond and Hybridization; Effective Atomic Number Theory: Werner complexes; Valance Band Theory: Octahedral, tetrahedral and square-planar complexes, Electro neutrality principle and ?'bonding; Electrostatic and Crystal Field Theory: Splitting of crystal field, 10 Dq energy, Weak field and strong field complexes, Tetrahedral, cubic and octahedral complexes, Chelate complexes, Jahn Tever theorem; Molecular orbital Theory (MOT): Investigation of simple and complex molecules, d orbits, Octahedral and tetrahedral complexes.

KİM435 Physical Chemistry III 4+0 4.0

Chemical Kinetics: Reaction rates, First-order reactions, Second-order reactions, Third-order reactions, Consecutive reactions, The temperature dependence of reaction rates, Reaction mechanisms and the rate law, Enzyme catalyzed reactions, Collision theory, Diffusion-controlled reactions, Activated complex theory; Electrochemistry: Faraday laws, Thermodynamics of electrolyte solutions, Thermodynamic functions of formation, Activity, Electrolytic conductivity, The concentration dependence of molar conductivity, Transport numbers, Electrochemical cells, Type of electrodes, Standard electrode potentials, Thermodynamics of reactions in cells, Varieties of electrochemical cells.Chemical Kinetics: Reaction rates, First-order reactions, Second-order reactions, Third-order reactions, Consecutive reactions, The temperature dependence of reaction rates, Reaction mechanisms and the rate law, Enzyme catalyzed reactions, Collision theory, Diffusion-controlled reactions, Activated complex theory; Electrochemistry: Faraday laws, Thermodynamics of electrolyte solutions, Thermodynamic functions of formation, Activity, Electrolytic conductivity, The concentration dependence of molar conductivity, Transport numbers, Electrochemical cells, Type of electrodes, Standard electrode potentials, Thermodynamics of reactions in cells, Varieties of electrochemical cells.

KİM435 (Eng) Physical Chemistry III 4+0 4.0

Chemical Kinetics: Reaction rates, First-order reactions, Second-order reactions, Third-order reactions, Consecutive reactions, The temperature dependence of reaction rates, Reaction mechanisms and the rate law, Enzyme catalyzed reactions, Collision theory, Diffusion-controlled reactions, Activated complex theory; Electrochemistry: Faraday laws, Thermodynamics of electrolyte solutions, Thermodynamic functions of formation, Activity, Electrolytic conductivity, The concentration dependence of molar conductivity, Transport numbers, Electrochemical cells, Type of electrodes, Standard electrode potentials, Thermodynamics of reactions in cells, Varieties of electrochemical cells.Chemical Kinetics: Reaction rates, First-order reactions, Second-order reactions, Third-order reactions, Consecutive reactions, The temperature dependence of reaction rates, Reaction mechanisms and the rate law, Enzyme catalyzed reactions, Collision theory, Diffusion-controlled reactions, Activated complex theory; Electrochemistry: Faraday laws, Thermodynamics of electrolyte solutions, Thermodynamic functions of formation, Activity, Electrolytic conductivity, The concentration dependence of molar conductivity, Transport numbers, Electrochemical cells, Type of electrodes, Standard electrode potentials, Thermodynamics of reactions in cells, Varieties of electrochemical cells.

KİM437 Bioaffinity Chromatography 2+0 3.0

Structure and Function of Proteins; Theory of Biochromatography; Gel Filtration; Ion Exchange Interaction Biochromatography; Hydrophobic Interaction Chromatography Of Proteins; Affinity Chromatography; Dye Ligand Affinity Chromatography; Immobilized Synthetic Dyes in Affinity Chromatography; Immobilized Pseudospesific Ligands In Affinity Chromatography; Immobilized Metal-Ion Affinity Chromatography; Intelligent Polymers, Imprented Polymers; Biomedical Applications of Bioaffinity Chromatography.

KİM438 Analysis Technics of Liquid Chromatography 1+2 3.0

Fundamental Properties of Liquid Chromatography Method: Mobile phase, column and selection of detector; Fundamental Principles of Ion Chromatography: Inorganic Anion and Cation Analysis: Nitrite, Nitrate, Fluoride, Chloride, Sulfate, Phosphate, Calcium, Magnesium, Potassium, Sodium; Organic Anion and Cation Analysis: Ascorbic Acid and Amines; Basic Principles and Applications of High Performance Liquid Chromatography; pharmaceuticals, dye, pesticide analysis.

KİM439 Work and Worker Safety for Chemists 2+0 3.0

Concepts of Worker and Employer: History of work and worker safety, Definition of worker, employer and work, Relationship between workers and employers, Workers wages and basic principles of charging, Obligations of employers and workers; Work Safety Legislation: Introduction to work health and safety, Worker health, Laws and legislations about work health and safety, Basic rights of workers; Audit of Work Health and Safety: Audit of workplaces, work health and safety, Work health and safety audit by government.

KİM440 Polymer Technology 2+0 3.0

Solid State, Mechanical and Thermal Properties of Polymers; Thermoplastics; Thermosets; Compounding; Molding; Compression molding; Transfer molding; Injection molding; Blow molding; Rotational molding; Extrusion, Film extrusion, Coating, Blow molding with extrusion; Thermoforming; Casting; Calendering; Foaming; Addivites; Plasticizers, Lubricants, Fillers, Antioxidants, Colorants, Flame retardants, Stabilizers; Fibers; Spinning, Melt spinning, Wet spinning, Dry spinning; Elastomers; Vulcanization, Reinforcement; Testing.

KİM441 Applied Chemistry I 2+4 10.0

Identifying and Specifying a Problem in Chemistry with an Advisor; Scanning a wide range of literature on the identified problem utilizing technology; Development of research questions or a hypothesis for the problem; Designing experimental research to facilitate the answers for the research questions or the hypothesis; Testing of the hypothesis and relating the findings to theoretical concepts; Writing of the research project with explanations of the steps taken to reach the results.Identifying and Specifying a Problem in Chemistry with an Advisor; Scanning a wide range of literature on the identified problem utilizing technology; Development of research questions or a hypothesis for the problem; Designing experimental research to facilitate the answers for the research questions or the hypothesis; Testing of the hypothesis and relating the findings to theoretical concepts; Writing of the research project with explanations of the steps taken to reach the results.

KİM441 (Eng) Applied Chemistry I 2+4 10.0

Identifying and Specifying a Problem in Chemistry with an Advisor; Scanning a wide range of literature on the identified problem utilizing technology; Development of research questions or a hypothesis for the problem; Designing experimental research to facilitate the answers for the research questions or the hypothesis; Testing of the hypothesis and relating the findings to theoretical concepts; Writing of the research project with explanations of the steps taken to reach the results.Identifying and Specifying a Problem in Chemistry with an Advisor; Scanning a wide range of literature on the identified problem utilizing technology; Development of research questions or a hypothesis for the problem; Designing experimental research to facilitate the answers for the research questions or the hypothesis; Testing of the hypothesis and relating the findings to theoretical concepts; Writing of the research project with explanations of the steps taken to reach the results.

KİM442 Applied Chemistry II 2+4 13.0

Providing required chemical and experimental facilities towards the determined method in KİM 442 Applied Chemistry I: Designing of experimental set up and calculation parameters, Processing experimental and theoretical studies, Applying needed analysis and synthesis processes, Collecting data, Confirming data by statistical methods, Clarifying the proposed method/s for the solution of the problem, Reporting the results, Determining the applicability of these results in technology, Oral or poster presentation of the report to the target groupProviding required chemical and experimental facilities towards the determined method in KİM 442 Applied Chemistry I: Designing of experimental set up and calculation parameters, Processing experimental and theoretical studies, Applying needed analysis and synthesis processes, Collecting data, Confirming data by statistical methods, Clarifying the proposed method/s for the solution of the problem, Reporting the results, Determining the applicability of these results in technology, Oral or poster presentation of the report to the target group.

KİM442 (Eng) Applied Chemistry II 2+4 13.0

Providing required chemical and experimental facilities towards the determined method in KİM 442 Applied Chemistry I: Designing of experimental set up and calculation parameters, Processing experimental and theoretical studies, Applying needed analysis and synthesis processes, Collecting data, Confirming data by statistical methods, Clarifying the proposed method/s for the solution of the problem, Reporting the results, Determining the applicability of these results in technology, Oral or poster presentation of the report to the target groupProviding required chemical and experimental facilities towards the determined method in KİM 442 Applied Chemistry I: Designing of experimental set up and calculation parameters, Processing experimental and theoretical studies, Applying needed analysis and synthesis processes, Collecting data, Confirming data by statistical methods, Clarifying the proposed method/s for the solution of the problem, Reporting the results, Determining the applicability of these results in technology, Oral or poster presentation of the report to the target group.

KİM444 Forensic Chemistry 2+0 3.0

Fundamental of Forensic Chemistry: The role of Chemistry in Crime Incident; Instrumental Analysis Methods in Forensic Chemistry: Spectroscopic, chromatographic and electro analytical methods; Crime Scene Data and Evidence : Collection of evidence, Transportation of evidence to laboratory, Determination of suitable methods of analysis for evidence, Preparation of evidence for analysis (preparation of solution, extraction, evaporation, derived evidence , filtration, purification etc.); Analysis of Blood and Urine Samples; Analysis of Abused Substance; Analysis of Explosive Substance; Analysis of Dye Substance; Analysis of Gun Powder Residue; Analysis of Fire Residue; Analysis of Textile Materials.

KİM445 Introduction to Archaeological Chemistry 2+0 3.0

Archaeological Chemistry and Archeometry; Terms and Concepts with Archaeological Chemistry; History of Archaeological Chemistry; Current Status and Scope of Archaeological Chemistry; What Archaeologists Want to Know; Archaeological Materials and Their Chemical Properties; Analysis Methods of Archaeological Materials; Identification and Authentication in Archaeological Materials; Archaeological Chemistry Studies and Some Examples in Turkey and in the World.

KİM446 Natural Polymeric Materials 2+0 3.0

Polymer Structure: The Basic Concepts of Polymer Chemistry, Classification of Polymers, Nomenclature of Polymers; Plant Polymers: Structure of Plant Polymers, Cotton Fiber, Linen Fiber, Cannabis Fiber, Hemp Fiber, Leaf Fiber, Fruit Fiber, Wood Fiber, Chemical and Physical Properties; Animal Polymers: Structure of Animal Polymers; Wool Fiber, Silk Fiber Hair, Furs; Chemical and Physical Properties, Natural Polymeric Materials Recognition Reactions Areas of Use of Natural Polymers.

KİM447 Instrumental Analysis Laboratory I 0+4 3.0

Qualitative and Quantitative Analysis with UV-Visible Spectroscopy; Infrared Spectroscopy; Illumination of Unknown Organic Compounds with Nuclear Magnetic Resonance Spectroscopy; Polarimetry: Investigating the decomposition kinetics of sugar, Finding the rotating angle of maltose and lactose; Conductometri: Collapsing and acid-base titrations; Finding the Composition of Unknown Compounds with Elemental Analysis; Qualitative and Quantitative Analysis with Spectro Florimetry; Volumetric Analysis with Polarography; Practicing Structure Analysis by Using UV, IR, NMR and Basic Analytic Instruments.

KİM448 Instrumental Analysis Laboratory II 0+4 3.0

Finding the Composition of Known and Unknown Compounds with Gas Chromatography-Mass Spectroscopy; Atomic Absorption Spectroscopy; Anion and Cation Analysis with Ion Chromatography; Quantitative Analysis with HPLC; Finding Pore Dimension and Surface Area of Polymers by BET; Finding Thermal Decomposition of CaC2H2O4.H2O with TGA; Analyzing Unknown Compounds with TLC; Determination of Isoelectric Point with Zetameter.

KİM450 Asymmetric Organic Synthesis Introduction 2+0 3.0

Stereochemical terms; The purpose and importance of asymmetric synthesis; Asymmetric synthesis and rules; General methods used in asymmetric synthesis; Asymmetric synthesis using chiral auxiliary component; Chiral catalysts and use of chiral catalysts in asymmetric synthesis; Overview of asymmetric organic reactions; Carbon-carbon bond formation; Asymmetric carbon-heteroatom bond formation; Addiction reactions to multiple bonds; Hydrogenation; Cyclization reactions; Reduction and oxidation reactions; Rearrangement reactions; Isomerazation; Applications and industrial importance of asymmetric synthesis.

KİM452 Bioinorganic Chemistry 2+0 3.0

Main elements forming structure of living organisms. Carbon, hydrogen, oxygen, nitrogen and phosphor in biomolecules. Trace elements in living organisms and their structural functions. Metalloenzymes. Effects of toxic metals on living organisms. Coordination compounds used in medicine. Inorganic compounds used in the diagnosis of diseases. Inorganic compounds used in the treatment of diseases.

KİM453 Chemistry and Technology of Paints 2+0 3.0

Polymers: Basic concepts about polymers, Some properties of polymers, Polymerization mechanisms, Methods for polymer manufacturing, Date of paints; Paint Content, Supplementary Materials and General Information about Paint Manufacturing: Fasteners (resins), Pigments and dyes, Fillers, Solvents, Other additives, Paint manufacturing; Classification of Paints: Classification with respect to environment, Classification with respect to resin type, Classification with respect to polymeric film forming processes, Classification with respect to application areas; Paint Application: Surfaces used for application and preparation of surfaces, Implementation techniques; Quality Tests for Paints: Characteristics of wet paint and related tests, Application of paints and related tests, Characteristics of dry film and related tests.

KİM454 Chemistry of Colloids 2+0 3.0

Basics of Colloid Chemistry: Classification of colloidal systems, Preparation and purification of colloidal systems, Kinetic Properties, Optical properties; Surface Tension and Surface Energy: Gibbs adsorption equation, Adhesion, cohesion and spreading, Surface and Interface Phenomenon in Colloidal systems: Electric double layer, Zeta potential, Stability of colloidal systems; Association Colloids and Micelle Formation; Emulsions; Foams.

KİM455 Applied Nuclear Magnetic Resonance Spectroscopy Technics 2+0 3.0

Fundamental Principles of Nuclear Magnetic Resonance Spectroscopy; Main Components of Nuclear Magnetic Resonance Spectroscopy Instrument: Radio frequency transmitter, Superconducting magnet, Detector and the cooling system; Analysis: Preparing a sample for nuclear magnetic resonance spectroscopy, Nuclear magnetic resonance spectroscopy analysis of nuclei such as proton, carbon, nitrogen and phosphor; Two-Dimensional Analysis: Two-dimensional correlation and two-dimensional heteronuclear correlation analysis of samples; Interpreting Spectrum.

KİM456 Chemistry of Cosmetics 2+0 3.0

The History of Cosmetics; Cosmetic Materials and Components: Hair-care products and hair shampoos, Skin-care products, Bath and shower products, Coloring materials and dyes, Make-up products, Antiperspirants and deodorants, Perfumes, Sunscreens, Soaps, Dental hygiene; Analytical Methods for Cosmetic Materials: Classical and instrumental methods, Chromatographic methods, Spectrophotometric methods; Microbiological Control of Cosmetics.

MAT115 Analytic Geometry I 2+2 5.0

Introduction: Axiomatic geometry in plane, Different coordinate sistems in the plane, Fundamental geometric objects in the plane with respect to different coordinate sistems, Cartesian coordinates in 3-space; Vectors:Directed segments and vectors, Algebra of vectors, Scalar product, Cross product, Base and linear dependence; Isometries of Plane: Reflections, Rotations, Translations and Structure theorems, The group of the isometries of plane; Colineations of plane: Affine transformations, Characterisation of the collineations.Introduction: Axiomatic geometry in plane, Different coordinate sistems in the plane, Fundamental geometric objects in the plane with respect to different coordinate sistems, Cartesian coordinates in 3-space; Vectors:Directed segments and vectors, Algebra of vectors, Scalar product, Cross product, Base and linear dependence; Isometries of Plane: Reflections, Rotations, Translations and Structure theorems, The group of the isometries of plane; Colineations of plane: Affine transformations, Characterisation of the collineations.

MAT116 Analytic Geometry II 2+2 5.0

Curves and Conics: Construction of conic sections, Directrix, Focus and common definition of conics; Plane Algebraic Curves of Degree 2: Calculation of the center and the directrix, Invariant of plane algebraic curves and classification; Analytic Geometry in 3-space: Lines, Planes and their positions relative to each other, Various characterizations of lines and planes, Reflection in 3-space and isometrics; Surfaces: Revolution surfaces, Cone, Cylinder, Regle surfaces, Classification of second degree algebraic surfaces.Curves and Conics: Construction of conic sections, Directrix, Focus and common definition of conics; Plane Algebraic Curves of Degree 2: Calculation of the center and the directrix, Invariant of plane algebraic curves and classification; Analytic Geometry in 3-space: Lines, Planes and their positions relative to each other, Various characterizations of lines and planes, Reflection in 3-space and isometrics; Surfaces: Revolution surfaces, Cone, Cylinder, Regle surfaces, Classification of second degree algebraic surfaces.

MAT117 Abstract Mathematics I 2+2 5.0

Statements and Sets: Algebra of statements, Mathematical proof, Quantifiers; Set Operations: Set families, Ordered pairs, Cartesian product of sets; Functions and Relations: Formal definition, Terminology, Relations, Equivalence relations, Partially ordered relations, Totally ordered sets, Upper bounds, Lower bounds, Least upper bound, Greatest lower bound, Well bound, Well ordered sets; Transfinite Induction.

MAT118 Abstract Mathematics II 2+2 5.0

Axiom of choice, Zorn's Lemma, Well ordering principle theorem. Algebraic structures: Binary Operations, Groups, Rings, Some special rings, Fields; Construction of number systems: Natural Numbers, Peano postulates, Principle of induction, Properties of natural numbers, Integers, Rational numbers, Real numbers; Cardinality; Equipotent Sets, Cantor theorem, Countable sets, Uncountable sets, Cardinal arithmetic, Ordinal numbers.

MAT196 Calculus II 5+1 5.5

Some Applications of Derivatives: Related rates, Extreme values, Concavity, Sketching the graph of a function, Extreme-value problems, Linear approximations, Taylor polynomials, Indeterminate forms; Integration: Sums and sigma notation, Areas as Limits of sums, The definite integral, Properties of the definite integral, The fundamental theorem of calculus; Indefinite Integration and Techniques of Integration: Indefinite Integration, Inverse substitutions, Partial integration, Integral of trigonometric functions, Integral of rational functions, Integral of algebtaric functions, Improper integrals; Applications of Integration: Areas of plane regions, Volumes of solids of revolution, Other volumes by slicing, Arc length and surface area, Mass, Moment and Center of maas; Sequences and Series: Sequences and Convegence, Infinite series, Power series, Taylor and Maclaurin series, Binomial theorem and binomial series.Some Applications of Derivatives: Related rates, Extreme values, Concavity, Sketching the graph of a function, Extreme-value problems, Linear approximations, Taylor polynomials, Indeterminate forms; Integration: Sums and sigma notation, Areas as Limits of sums, The definite integral, Properties of the definite integral, The fundamental theorem of calculus; Indefinite Integration and Techniques of Integration: Indefinite Integration, Inverse substitutions, Partial integration, Integral of trigonometric functions, Integral of rational functions, Integral of algebtaric functions, Improper integrals; Applications of Integration: Areas of plane regions, Volumes of solids of revolution, Other volumes by slicing, Arc length and surface area, Mass, Moment and Center of maas; Sequences and Series: Sequences and Convegence, Infinite series, Power series, Taylor and Maclaurin series, Binomial theorem and binomial series.

MAT196 (Eng) Calculus II 5+1 5.5

Some Applications of Derivatives: Related rates, Extreme values, Concavity, Sketching the graph of a function, Extreme-value problems, Linear approximations, Taylor polynomials, Indeterminate forms; Integration: Sums and sigma notation, Areas as Limits of sums, The definite integral, Properties of the definite integral, The fundamental theorem of calculus; Indefinite Integration and Techniques of Integration: Indefinite Integration, Inverse substitutions, Partial integration, Integral of trigonometric functions, Integral of rational functions, Integral of algebtaric functions, Improper integrals; Applications of Integration: Areas of plane regions, Volumes of solids of revolution, Other volumes by slicing, Arc length and surface area, Mass, Moment and Center of maas; Sequences and Series: Sequences and Convegence, Infinite series, Power series, Taylor and Maclaurin series, Binomial theorem and binomial series.Some Applications of Derivatives: Related rates, Extreme values, Concavity, Sketching the graph of a function, Extreme-value problems, Linear approximations, Taylor polynomials, Indeterminate forms; Integration: Sums and sigma notation, Areas as Limits of sums, The definite integral, Properties of the definite integral, The fundamental theorem of calculus; Indefinite Integration and Techniques of Integration: Indefinite Integration, Inverse substitutions, Partial integration, Integral of trigonometric functions, Integral of rational functions, Integral of algebtaric functions, Improper integrals; Applications of Integration: Areas of plane regions, Volumes of solids of revolution, Other volumes by slicing, Arc length and surface area, Mass, Moment and Center of maas; Sequences and Series: Sequences and Convegence, Infinite series, Power series, Taylor and Maclaurin series, Binomial theorem and binomial series.

MAT199 Calculus I 5+1 5.5

Preliminaries: Real numbers and real line, Cartesian coordinates in the plane, Graphs of second grade equations; Functions and their graphs: Combining functions to make new functions, Trigonometric functions; Limit and continuity: Examples of velocity, Growth rate and area, Limits of functions, Limits at infinity and infinite limits, Continuity; Differentiation: Tangent lines and their slopes, The derivative, Differentiation rules, The chain rule, Derivatives of trigonometric functions, Mean-Value Theorem, Higher-Order derivatives, İmplicit differentiation; Transcendental Functions: Inverse functions, Exponential and logarithmic functions, Growth and decay, The inverse trigonometric functions, Hyperbolic functions, Inverse hyperbolic functions; Complex Numbers: Graphical representation of Complex numbers, Complex arithmetic, Roots of complex numbers.Preliminaries: Real numbers and real line, Cartesian coordinates in the plane, Graphs of second grade equations; Functions and their graphs: Combining functions to make new functions, Trigonometric functions; Limit and continuity: Examples of velocity, Growth rate and area, Limits of functions, Limits at infinity and infinite limits, Continuity; Differentiation: Tangent lines and their slopes, The derivative, Differentiation rules, The chain rule, Derivatives of trigonometric functions, Mean-Value Theorem, Higher-Order derivatives, İmplicit differentiation; Transcendental Functions: Inverse functions, Exponential and logarithmic functions, Growth and decay, The inverse trigonometric functions, Hyperbolic functions, Inverse hyperbolic functions; Complex Numbers: Graphical representation of Complex numbers, Complex arithmetic, Roots of complex numbers.

MAT199 (Eng) Calculus I 5+1 5.5

Preliminaries: Real numbers and real line, Cartesian coordinates in the plane, Graphs of second grade equations; Functions and their graphs: Combining functions to make new functions, Trigonometric functions; Limit and continuity: Examples of velocity, Growth rate and area, Limits of functions, Limits at infinity and infinite limits, Continuity; Differentiation: Tangent lines and their slopes, The derivative, Differentiation rules, The chain rule, Derivatives of trigonometric functions, Mean-Value Theorem, Higher-Order derivatives, İmplicit differentiation; Transcendental Functions: Inverse functions, Exponential and logarithmic functions, Growth and decay, The inverse trigonometric functions, Hyperbolic functions, Inverse hyperbolic functions; Complex Numbers: Graphical representation of Complex numbers, Complex arithmetic, Roots of complex numbers.Preliminaries: Real numbers and real line, Cartesian coordinates in the plane, Graphs of second grade equations; Functions and their graphs: Combining functions to make new functions, Trigonometric functions; Limit and continuity: Examples of velocity, Growth rate and area, Limits of functions, Limits at infinity and infinite limits, Continuity; Differentiation: Tangent lines and their slopes, The derivative, Differentiation rules, The chain rule, Derivatives of trigonometric functions, Mean-Value Theorem, Higher-Order derivatives, İmplicit differentiation; Transcendental

Functions: Inverse functions, Exponential and logarithmic functions, Growth and decay, The inverse trigonometric functions, Hyperbolic functions, Inverse hyperbolic functions; Complex Numbers: Graphical representation of Complex numbers, Complex arithmetic, Roots of complex numbers.

MAT203 Linear Algebra I 4+0 5.0

Topological Spaces; Basic Concepts; Neighbourhoods; Base and Subbase; Continuous Functions; Product Spaces; Quotient Spaces; Convergence; Nets and Filters; Separation and Countability; Separation Axioms; Countability Properties; Compact Spaces; Local Compact Spaces and Compactness; Metrizable; Complete Metric Spaces and Baire's Theorems; Connected Spaces; Local-Connectedness and Path-Connectedness.

MAT204 Linear Algebra II 4+0 5.0

Systems of Linear Equations: Solutions of Systems of Linear Equations, Method of Gauss Elimination, Cramer Method; Characteristic Value and Characteristic Vectors: Basic Definitions, Rank of a Linear Transformation, Characteristic Polynomial of a Linear Transformation, Diagonalization, Fundamental Theorem of Algebra; Inner Product Spaces: Definitions and Examples, Orthogonal Systems, Gram-Smith Method of Orthogonalization; Spectrum Theorem and Quadratic Forms.

MAT208 Differential Equations 3+0 4.5

Definition of Differential Equation: Solutions of differential equations; First Order and First Degree Differential Equations: Separable equations, Homogeneous differential equations, Linear differential equations, Exact equations; Higher Order Linear Equations With Constant Coefficients and Applications: Homogeneous equations, Non-homogeneous equations.

MAT209 Analysis I 4+0 7.0

Sets and Series: Sets and convergence in sets, Lower and upper limits, Subsets, Series and convergence in series, Positive series, Alternate series, Absolute convergence; Power Series: Taylor and McLaurent series and applications; Multivariate Functions: Limit and sequential limits; Derivative for Multivariate Functions: Derivative and partial derivatives, Directional derivatives, Higher order derivatives; Chains Rule; Closed Functions; Applications of Partial Derivative: Max and min in multivariate functions, Conditional max and min.

MAT212 Analysis II 4+0 7.0

Riemann Integration: Riemann-Darboux's lower and upper sums and definite integration of a function, Properties of definite integration, Theorem for differential and integral analysis, Indefinite integration and properties, Mean value theorem; Integration Methods; Improper Integrals; Multiple Integration: Definition and properties of multiple integration, Mean value theorem for multiple integration, Variable transformation for multiple integration; Curved Integral's Definition and Properties; Applications of Multiple Integrals: Green and stokes theorems, Theorem of divergence.

MAT213 Computer Programming I 2+2 5.0

Structure of a Programming Language: Special symbols and words, Data types, Variables, Constants, Definition blocks and Operators; Basic Commands and Functions: I/O commands, Conditional statements, Loops; Subroutines: Functions, Procedures, Standard function and procedures; Arrays: Vector arrays, Two dimension arrays, Multiple dimension arrays; Files: File types, File implementation statements, Graphical statements and drawing methods.

MAT214 Computer Programming II 2+2 5.0

Visual Programming: Visual programming environment and structure, Objects, Properties, Events and methods; Components of a Visual Programming Language: Types and variables, Constants, Branches, Loops, Operators, Units; Implementation on Data Types; File Structures, Pointers, File I/O operations, Arrays, Records, Text files, Databases.

MAT215 Differential Equations I 2+2 5.0

Differential Equations and Their Solutions: Classification of differential equations, Solution of differential equations, Existence and uniqueness theorems; First Order Ordinary Differential Equations: Separable equations, Homogeneous differential equations, Linear differential equations, Bernoulli and Riccati differential equations, Exact differential equations, Integrating Factors; Applications of First Order Equations and Orthogonal Trajectories; Introduction to Higher Order Linear Differential Equations.Differential Equations and Their Solutions: Classification of differential equations, Solution of differential equations, Existence and uniqueness theorems; First Order Ordinary Differential Equations: Separable equations, Homogeneous differential equations, Linear differential equations, Bernoulli and Riccati differential equations, Exact differential equations, Integrating Factors; Applications of First Order Equations and Orthogonal Trajectories; Introduction to Higher Order Linear Differential Equations.

MAT216 Differential Equations II 2+2 5.0

Higher Order Linear Differential Equations: Homogeneous linear equations with constant coefficients and nonhomogeneous linear equations with constant coefficients, Method of undetermined coefficients, Method of variation of parameters, Cauchy-Euler equation; Series Solution: Method of power series, Solution about ordinary points, Solution about singular

points, Method of Frobenius; Systems of Linear Differential Equations; Lablace Transform and Inverse Lablace Transform; Solution of Differential Equations With Constant Coefficients and Linear Systems.Higher Order Linear Differential Equations: Homogeneous linear equations with constant coefficients and nonhomogeneous linear equations with constant coefficients, Method of undetermined coefficients, Method of variation of parameters, Cauchy-Euler equation; Series Solution: Method of power series, Solution about ordinary points, Solution about singular points, Method of Frobenius; Systems of Linear Differential Equations; Lablace Transform and Inverse Lablace Transform; Solution of Differential Equations With Constant Coefficients and Linear Systems.

MAT218 Documentation with LaTeX 3+0 5.0

Basics of LaTeX: A Brief History of TeX and LaTeX, Components of LaTeX and Installation, LaTeX and Text Editors; Document Structure: Document Classes, The Title Page, Sectioning Commands, Numbering; Formatting Commands: Lines and Paragraphs, List Environments, Footnotes and Headings, Multicolumns, Tabular Environments, Basic Font Characteristics; Mathematical Formulas: Mathematical Environments, Theorem, Proposition, etc. Environments, Mathematical Symbols; The Layout of the Page and Customizing LaTeX: Page Settings, Page Layout, Counters, User-defined Commands; Graphics with LaTeX: Graphics with LaTeX and Graphics Packages; The Table of Contents, Bibliographies and Index Generation: The Table of Contents, Bibliography Generation and Cross-referencing, Index Generation.

MAT221 Analysis I 4+2 7.0

Sequences and Infinite Series:Sequences and convergence of a sequence, Subsequences, Accumulation points, Lower and upper limits, Infinite series and convergence of a series, Series of positive terms, Alternating series, Absolute convergence of series; Sequences and Series of Functions, Pointwise convergence, Uniform convergence, Power series, Taylor theorem, Differentiation of sequences and series of functions; Elementary Transcendental Functions: Exponential and logarithmic functions, Trigonometric and inverse trigonometric functions, Limits and continuity, Differentiation and applications of differentiation.

MAT222 Analysis II 4+2 7.0

Riemann Integral: Lower and upper Riemann-Darboux sums and definite integral of a function, Properties of definite integral, Fundamental theorem of calculus, Indefinite integral and properties, Mean value theorem and uniform convergence theorems; Tecniques of Integration; Improper integrals, Types of improper integrals, Tests for convergence of improper integrals; Gamma Function.

MAT226 Introduction to Graph Theory 3+0 5.0

What is a Graph: Fundamental concepts, Graph, Vertex, Edge, Adjacency, Degree, Isomorphism, Various examples, Certain special graphs, Digraphs and multigraphs; Paths and Cycles: Walk, Trail, Cycle, Connected graphs, Eulerian trail, Eulerian graph, Hamiltonian cycle, Hamiltonian graph; Trees: Fundamental properties, Counting trees, Cayley's theorem, Minimum spanning tree problem; Planar Graphs: Definition and examples, Kuratowski's theorem, Euler's formula, Dual graphs; Colouring Graphs: Colouring vertices, Chromatic number, Brook's theorem, The four colour theorem, Chromatic polynomials, Colouring maps, Colouring edges; Matching: Perfect matching, Marriage theorem

MAT227 Geometry I 3+0 5.0

Axiomatic Systems: Historical background, Axiomatic systems and their properties, Finite geometries; Axiom sets for geometry: Euclid?s geometry, Hilbert Axioms for Euclidean geometry, Birkhoff?s axioms for Euclidean geometry, The SMSG postulates for Euclidean geometry; Neutral geometry: Preliminary notions, Congruence conditions, The Saccheri-Legendre theorem, Euclidean Geometry of the Plane: The parallel postulate and some implications, Congruence and Area, Similarity, Some Euclidean Congruence results concerning circles, Some Euclidean results concerning triangles.

MAT228 Geometry II 3+0 5.0

Analytical and trasformational geometry: Introduction, Analytical geometry, Historical perspective, Coordinatization of the plane, Transformational geometry, Transformations, Analytical transformations; Non-Euclidean geometries:Introduction, The hyperbolic parallel postulate, Hyperbolic results concerning polygons, Area in hyperbolic geometry, A model for hyperbolic geometry, Elliptic geometry; Projective geometry: Introduction, The real projective plane, Duality, Perspectivity, The theorem of Desargues, Projective transformations.

MAT239 Discrete Mathematics 3+0 5.0

Fundamental Principles of Counting; Sets; Combinatorial Tools: Induction, Inclusion-Exclusion, Pigeonholes; Binomial Coefficients and Pascal?s Triangle: The Binomial Theorem, Distribution Problems, Identities in Pascal?s Triangle; Fibonacci Numbers; Combinatorial Probability; Integers, Divisors and Primes: Divisibility of Integers, Primes and Their Properties, Fermat?s Little Theorem, The Euclidean Algorithm; Graphs; Eulerian Walks; Trees; The Travelling Salesman Problem; Matchings in Graphs; Euler?s Formula; Coloring Graphs; A Glimpse of CryptographyFundamental Principles of Counting; Sets; Combinatorial Tools: Induction, Inclusion-Exclusion, Pigeonholes; Binomial Coefficients and Pascal's Triangle: The Binomial Theorem, Distribution Problems, Identities in Pascal's Triangle; Fibonacci Numbers; Combinatorial Probability; Integers, Divisors and Primes: Divisibility of Integers, Primes and Their Properties, Fermat's Little Theorem,

The Euclidean Algorithm; Graphs; Eulerian Walks; Trees; The Travelling Salesman Problem; Matchings in Graphs; Euler's Formula; Coloring Graphs; A Glimpse of Cryptography

MAT239 (Eng) Discrete Mathematics 3+0 5.0

Fundamental Principles of Counting; Sets; Combinatorial Tools: Induction, Inclusion-Exclusion, Pigeonholes; Binomial Coefficients and Pascal?s Triangle: The Binomial Theorem, Distribution Problems, Identities in Pascal?s Triangle; Fibonacci Numbers; Combinatorial Probability; Integers, Divisors and Primes: Divisibility of Integers, Primes and Their Properties, Fermat?s Little Theorem, The Euclidean Algorithm; Graphs; Eulerian Walks; Trees; The Travelling Salesman Problem; Matchings in Graphs; Euler?s Formula; Coloring Graphs; A Glimpse of CryptographyFundamental Principles of Counting; Sets; Combinatorial Tools: Induction, Inclusion-Exclusion, Pigeonholes; Binomial Coefficients and Pascal's Triangle: The Binomial Theorem, Distribution Problems, Identities in Pascal's Triangle; Fibonacci Numbers; Combinatorial Probability; Integers, Divisors and Primes: Divisibility of Integers, Primes and Their Properties, Fermat's Little Theorem, The Euclidean Algorithm; Graphs; Eulerian Walks; Trees; The Travelling Salesman Problem; Matchings in Graphs; Euler's Formula; Coloring Graphs; A Glimpse of Cryptography

MAT256 English for Mathematicians 3+0 5.0

Content: Mathematical terms, analysis of a scientific essay and technical terms in broad sence, reading a mathematical essay and studying its grammar, writing and preperation of a scientific assay, analysis of a popular scientific essay.Content: Mathematical terms, analysis of a scientific essay and technical terms in broad sence, reading a mathematical essay and studying its grammar, writing and preperation of a scientific assay, analysis of a popular scientific essay.

MAT256 (Eng) English for Mathematicians 3+0 5.0

Content: Mathematical terms, analysis of a scientific essay and technical terms in broad sence, reading a mathematical essay and studying its grammar, writing and preperation of a scientific assay, analysis of a popular scientific essay.Content: Mathematical terms, analysis of a scientific essay and technical terms in broad sence, reading a mathematical essay and studying its grammar, writing and preperation of a scientific assay, analysis of a popular scientific essay.

MAT261 Differential Equations 3+0 5.0

First Order Ordinary Differential Equations: Solutions of first order ordinary differential equations, Geometric and physical applications; Second Order Ordinary Differential Equations: Solutions of ordinary differential equations; Higher Order Linear Differential Equations: Solutions of higher order differential equations, Series solutions of differential equations.First Order Ordinary Differential Equations: Solutions of first order ordinary differential equations, Geometric and physical applications; Second Order Ordinary Differential Equations: Solutions of ordinary differential equations; Higher Order Linear Differential Equations: Solutions of higher order differential equations, Series solutions of differential equations.

MAT261 (Eng) Differential Equations 3+0 5.0

First Order Ordinary Differential Equations: Solutions of first order ordinary differential equations, Geometric and physical applications; Second Order Ordinary Differential Equations: Solutions of ordinary differential equations; Higher Order Linear Differential Equations: Solutions of higher order differential equations, Series solutions of differential equations.First Order Ordinary Differential Equations: Solutions of first order ordinary differential equations, Geometric and physical applications; Second Order Ordinary Differential Equations: Solutions of ordinary differential equations; Higher Order Linear Differential Equations: Solutions of higher order differential equations, Series solutions of differential equations.

MAT263 Proof Without Words 2+0 3.0

Proofs without Words in Geometry: Proofs on lengths, areas and angles, Proofs on analytical geometry; Proofs without Words in Algebra: Proofs on algebraic identities, Proofs on integer sums, Proofs on linear algebra; Proofs without Words in Analysis: Proofs on sequences and series, Proofs on inequalities, Proof on trigonometric identities.

MAT265 Mathematical Softwares 3+0 5.0

Data Types and Variables; Basic Operations and Commands: Numbers, Sets, Functions, Sequences, Lists, Matrices; Basic Mathematical Procedures and Operators; Mathematical Applications: Numerical and algebraic solutions of equations, Limit, Derivative, Integral, Matrix operations; Graphs: 2-Dimensional plotting, 3-Dimensional plotting, Animated plotting.

MAT267 Mathematics with Models 2+0 3.0

Several Models for the Proof of Pythagorean Theorem; Pantograph as an Application of Thales Theorem; The Demokrit Model for the Volume of Pyramid; The Platonic Solid Models and Their Sections; The Archimedes Model for the Volume of Sphere; Models for the Area of the Disc; Models for Binomial Expansion; Models for the Sums of Squares and Cubes; A Model for the Theorem of Spherical Triangle; Models for the Conic Sections; Hyperboloid Models; Invertor; Polygon Partitioning; Cuts of the Möbius Strip; 7 Coloured Map on Torus; Arnold Bricks.Several Models for the Proof of Pythagorean Theorem; Pantograph as an Application of Thales Theorem; The Demokrit Model for the Volume of Pyramid; The Platonic Solid Models and Their Sections; The Archimedes Model for the Volume of Sphere; Models for the Area of the Disc; Models for Binomial Expansion; Models for the Sums of Squares and Cubes; A Model for the Theorem of

Spherical Triangle; Models for the Conic Sections; Hyperboloid Models; Invertor; Polygon Partitioning; Cuts of the Möbius Strip; 7 Coloured Map on Torus; Arnold Bricks.

MAT267 (Eng) Mathematics with Models 2+0 3.0

Several Models for the Proof of Pythagorean Theorem; Pantograph as an Application of Thales Theorem; The Demokrit Model for the Volume of Pyramid; The Platonic Solid Models and Their Sections; The Archimedes Model for the Volume of Sphere; Models for the Area of the Disc; Models for Binomial Expansion; Models for the Sums of Squares and Cubes; A Model for the Theorem of Spherical Triangle; Models for the Conic Sections; Hyperboloid Models; Invertor; Polygon Partitioning; Cuts of the Möbius Strip; 7 Coloured Map on Torus; Arnold Bricks.Several Models for the Proof of Pythagorean Theorem; Pantograph as an Application of Thales Theorem; The Demokrit Model for the Volume of Pyramid; The Platonic Solid Models and Their Sections; The Archimedes Model for the Volume of Sphere; Models for the Area of the Disc; Models for Binomial Expansion; Models for the Sums of Squares and Cubes; A Model for the Theorem of Spherical Triangle; Models for the Conic Sections; Hyperboloid Models; Invertor; Polygon Partitioning; Cuts of the Möbius Strip; 7 Coloured Map on Torus; Arnold Bricks.

MAT273 Construction of Number Systems 3+0 5.0

Natural Numbers: Axioms, Addition for natural numbers, Sorting of natural numbers, Multiplication of natural numbers; Fractions: Definition and equivalence, Sorting of fractions, Addition of fractions, Multiplication of fractions, Rational numbers and integers; Cuts: Definition of cuts, Sorting of cuts, Addition of cuts, Multiplication of cuts, Rational cuts and integral cuts; Real Numbers: Definition of real numbers, Sorting in real numbers, Addition of real numbers, Multiplication of real numbers, Dedekind's fundamental theorem.Natural Numbers: Axioms, Addition for natural numbers, Sorting of natural numbers, Multiplication of natural numbers; Fractions: Definition and equivalence, Sorting of fractions, Addition of fractions, Multiplication of fractions, Rational numbers and integers; Cuts: Definition of cuts, Sorting of cuts, Addition of cuts, Multiplication of cuts, Rational cuts and integral cuts; Real Numbers: Definition of real numbers, Sorting in real numbers, Addition of real numbers, Multiplication of real numbers, Dedekind's fundamental theorem.

MAT273 (Eng) Construction of Number Systems 3+0 5.0

Natural Numbers: Axioms, Addition for natural numbers, Sorting of natural numbers, Multiplication of natural numbers; Fractions: Definition and equivalence, Sorting of fractions, Addition of fractions, Multiplication of fractions, Rational numbers and integers; Cuts: Definition of cuts, Sorting of cuts, Addition of cuts, Multiplication of cuts, Rational cuts and integral cuts; Real Numbers: Definition of real numbers, Sorting in real numbers, Addition of real numbers, Multiplication of real numbers, Dedekind's fundamental theorem.Natural Numbers: Axioms, Addition for natural numbers, Sorting of natural numbers, Multiplication of natural numbers; Fractions: Definition and equivalence, Sorting of fractions, Addition of fractions, Multiplication of fractions, Rational numbers and integers; Cuts: Definition of cuts, Sorting of cuts, Addition of cuts, Multiplication of cuts, Rational cuts and integral cuts; Real Numbers: Definition of real numbers, Sorting in real numbers, Addition of real numbers, Multiplication of real numbers, Dedekind's fundamental theorem.

MAT309 Advanced Programming 2+2 5.0

Linked Lists: Single linked lists, Double linked lists; Stack: Structure and using areas of stacks; Queue: Structure and using areas of queues; Searching: Standard Searching algorithms, types and comparison; Sorting: Well-known sorting algorithms, types and advantages. Drawing Methods: Drawing algorithms for mathematical curves, Drawing algorithms for mathematical surfaces; File Processing Techniques: Files, File systems, Database structures.

MAT310 Selected Topics on Computer 2+2 5.0

Office Packages: Detailed information of actual office packages. Word processing programs and user tricks, Spreadsheet programs and user tricks, Presentation programs and user tricks, Database management software and using, Scheduler and desktop organizer software using; Mathematics Packages: Introducing popular mathematics packages such as Maple, MathCad, Mathematica, Matlab, etc; Image Processing Software: Foundations of popular Image Processing Software.

MAT311 Numerical Analysis I 3+0 5.0

Approximation Theory: Discrete Least-Squares approximation; Interpolation: Lagrange interpolation polynomial, Hermite interpolation polynomial, Cubic natural spline interpolation, Cubic clamped spline interpolation; Solutions of Equations with One Variable: Bisection Algorithm, Fixed Point Iteration, Newton-Raphson Method.

MAT312 Numerical Analysis II 3+0 5.0

Numerical Integration: Trapezoidal Rule, Simson 1/3 Rule, Simson 3/8 Rule, Romberg Integration, Composite Trapezoidal Rule, Composite Simson 1/3 Rule, Composite Simpson 3/8 Rule; Numerical Solutions of Differential Equations: Euler's Method, Higher-Order Taylor Methods, Runge-Kutta Methods; Numerical Solutions of Systems of Differential Equations; Numerical Solutions of Higher-Order Equations; Numerical Solutions of Nonlinear Systems of Equations: Fixed Point Iteration, Newton-Raphson Method.

MAT313 Differential Geometry I 3+0 5.0

Calculus on Euclidean space: Euclidean space, Tangent vectors, Tangent, Tangent space, Natural frame fields, Directional derivatives, Curves in IR3, 1-Forms, Differential forms, Exterior derivative, Mappings; Frame fields: Dot Product, Cross product, Curves, Frenet frame fields, Frenet-Serret formulae, Arbitrary-speed curves, Frenet-Serret formulae for arbitrary speed curves, Covariant derivatives.

MAT314 Differential Geometry II 3+0 5.0

Euclidean Geometry: Isometries of IR3, Tangent map of an isometry orientation, Congruence of curves, Calculus on a surface; Surfaces in IR3, Patch computations, Differentiable functions and tangent vectors, Differential forms on a surface: Mappings of surfaces, Integration of forms, Topological properties of surfaces, Manifolds.

MAT315 History of Mathematics I 3+0 5.0

Egyptian and Babylonian Mathematics: Computational techniques in Egypt, Egyptian geometry, Systems of Numeration, Numerals and art of computation, Sexagesimal system, Sumerian computation techniques, Babylonian mathematics, Babylonian algebra, Babylonian geometry, Babylonian arithmetics; Mathematics in Hellenistic Age: Centuries of Thales and Pythagoras, the Golden Age, the Age of Plato, Archytas, Eudoxus of Cnidos, Euclid and the Elements, Alexandrian period, Archimedes of Syracuse, Eratosthenes, Apollonius of Perga; Decline of Hellenistic Mathematics: Inner and outer causes of decline; History of Trigonometry:Menelaus, Heron; Diophantus Equations: Theorem of Pappus; Hypatia, School of Athens.

MAT316 History of Mathematics II 3+0 5.0

Mathematics in China and India: Abacus and decimals, Aryabhata, Brahmagupta, Bhaskara, Ramanujan; Mathematics in Islamic Period: al-Khowarizmi, Abd al-Hamid ibn-Turk, Thabit ibn-Qurra, Trigonometry in Islamic period, Abu'I Wefa, Al-Biruni, Alhazen, Omar Khayyam, Al-Kashi; Mathematics in Europe in the Middle Ages: Fibonacci, A solution of a cubic equation; Mathematics of the Renaissance; Prelude to Modern Mathematics; The time of Fermat and Descartes, khe time of Newton and Leibniz, Bernoulli Era, Age of Euler, Time of Gauss and Cauchy.

MAT318 Matrix Analysis 3+0 5.0

Preliminaries: Vector spaces, Matrices and determinants, Special types of matrices; Unitary Equivalence and normal matrices: Unitary equivalence, Schur's unitary triangularization theorem and some implications of Schur's theorem, Normal matrices, QR factorization and algorithm; Canonical forms: The Jordan canonical form and applications, Matrices polynominal and the minimal polynomial, Other canonical forms and factorization, Triangular factorizations; Hermitian and Symmetric matrices: Variational characterization of eigenvalues of Hermitian matrices, Some applications of the variational characterizations.

MAT318 (Eng) Matrix Analysis 3+0 5.0

Preliminaries: Vector spaces, Matrices and determinants, Special types of matrices; Unitary Equivalence and normal matrices: Unitary equivalence, Schur's unitary triangularization theorem and some implications of Schur's theorem, Normal matrices, QR factorization and algorithm; Canonical forms: The Jordan canonical form and applications, Matrices polynominal and the minimal polynomial, Other canonical forms and factorization, Triangular factorizations; Hermitian and Symmetric matrices: Variational characterization of eigenvalues of Hermitian matrices, Some applications of the variational characterizations.

MAT319 Euclidean and Non-Euclidean Geometries 3+0 5.0

Introduction: Geometries in General, Necessity of Non-Euclidean Geometry and Inadequacy of Euclidean Geometry; Elliptic Geometry: Geometry on Sphere, Analytical Expressions for Points and Lines, Elliptic Isometries and Collinations; Spherical Trigonometry: Concepts of Angle, Triangle and Polygon, Calculations of Areas and Length; Hyperbolic Geometry: Disk Model, Upper Half Plane Model, Projective Model, Concepts of Angle, Triangle and Polygon in these Models and Calculations of Areas and Length; A Short Introduction to Hyperbolic Isometries.

MAT321 Complex Analysis I 2+2 5.0

Complex Numbers: Algebraic and geometric properties, Polar form, Exponential form, Powers and roots; Topological Properties of Complex Plane; Complex Functions and Sequences: Limit and continuity, Derivatives, Cauchy-Riemann equations, Sufficient conditions, Analytic functions, Harmonic functions; Elementary Functions: Exponential function, Logarithmic function, Trigonometric functions; Complex Integrals: Contours, Contour integrals, Cauchy-Goursat theorem, Cauchy integral formula, Derivatives of analytic functions.Complex Numbers: Algebraic and geometric properties, Polar form, Exponential form, Powers and roots; Topological Properties of Complex Plane; Complex Functions and Sequences: Limit and continuity, Derivatives, Cauchy-Riemann equations, Sufficient conditions, Analytic functions, Harmonic functions; Elementary Functions: Exponential function, Logarithmic function, Trigonometric functions; Complex Integrals: Contours, Contour integrals, Cauchy-Goursat theorem, Cauchy integral formula, Derivatives of analytic functions.

MAT322 Complex Analysis II 2+2 5.0

Derivatives of Analytic Functions: Morera's theorem, Maximum moduli of functions, Liouville's theorem and fundamental theorem of algebra; Complex Series: Sequences and series of complex functions, Absolute and uniform convergence,

Cauchy convergence principle, Weierstrass test, Power series and radius of convergence; Taylor and Laurent Series; Zeros, Poles and Residues of Complex Function: Residue theorem, Evaluation of complex integrals, Evaluation of real integrals, Logarithmic residues and Rouche's theorem.Derivatives of Analytic Functions: Morera's theorem, Maximum moduli of functions, Liouville's theorem and fundamental theorem of algebra; Complex Series: Sequences and series of complex functions, Absolute and uniform convergence, Cauchy convergence principle, Weierstrass test, Power series and radius of convergence; Taylor and Laurent Series; Zeros, Poles and Residues of Complex Function: Residue theorem, Evaluation of complex integrals, Evaluation of real integrals, Logarithmic residues and Rouche's theorem.

MAT323 Abstract Algebra I 2+2 5.0

Basic Concepts: Integers and irrational numbers, Fundamental theorem of arithmetics, Division algorithm, Euclid's algorithm, Euler function, Modular arithmetics, Fermat-Euler theorems, Linear congruences: Group Theory, Definition of a group, Direct products, Subgroups, Cyclic groubs, Normal subgroups, Homomorphism, Isomorphism and their elemantary properties, Symmetric groups, Finite Abelian Groups, Sylow's theorem.

MAT324 Abstract Algebra II 2+2 5.0

Ring Theory: Definition and examples of rings, Some special classes of rings, Subrings, Ideals, Quotient rings, Ring homomorphisms, Ring isomorphisms, Factor rings, Characteristics of an integral domain or field, Field of fractions of an integral domain, Polynomials and fields, Polynomial rings, Some properties of field, Degrees of field extensions.

MAT325 Metric and Topological Spaces I 2+2 5.0

Metric spaces: Motivation, Open sets in metric spaces, Equivalent metrics, Continuity; Topological Spaces: Definition of topology, Bases, Sub-bases and weak topology, Subspaces, Product spaces, Quotient spaces, Homomorphisms; Hausdorff Spaces, Separation axioms; Compact Spaces: Motivation, Definition of Compactness, Properties of compact spaces, Continuous maps on compact spaces, Compactness and constructions, Compactness and uniform cont inuity, Inverse function theorem.Metric spaces: Motivation, Open sets in metric spaces, Equivalent metrics, Continuity; Topological Spaces: Definition of topology, Bases, Sub-bases and weak topology, Subspaces, Product spaces, Quotient spaces, Homomorphisms; Hausdorff Spaces, Separation axioms; Compact Spaces: Motivation, Definition of Compactness, Properties of compact spaces, Continuous maps on compact spaces, Compactness and constructions, Compactness and uniform cont inuity, Inverse function theorem.

MAT326 Metric and Topological Spaces II 2+2 5.0

Connected Spaces: Connectedness and path-connectedness, Comparison of definitions, Components; Convergence in Metric Spaces: Sequential compactness, Uniform converge, Cauchy's criterion, Uniform limits of sequences, Generalizations; Complete Metric Spaces: Definition, Fixed point theorems, Contraction mapping theorem, Cantor's and Baire's theorems;Criteria for Compactness in Metric Spaces: A general criterion, Arzelâ-Ascoli theorems, Completion of metric spaces.Connected Spaces: Connectedness and path-connectedness, Comparison of definitions, Components; Convergence in Metric Spaces: Sequential compactness, Uniform converge, Cauchy's criterion, Uniform limits of sequences, Generalizations; Complete Metric Spaces: Definition, Fixed point theorems, Contraction mapping theorem, Cantor's and Baire's theorems;Criteria for Compactness in Metric Spaces: A general criterion, Arzelâ-Ascoli theorems, Completion of metric spaces.

MAT327 Analysis III 4+2 7.0

Finite Dimensional Spaces; Functions: Real valued functions of several variables, Vector valued functions of one variable, Vector valued functions of several variables; Limit and continuity: Limits and iterated limits, Continuous functions, The Weierstrass theorem, Uniform continuity; Derivative of Functions of Several Variables: Derivatives and partial derivatives: Directional derivatives, Higher order derivatives; The Schwarz theorem, The Taylor Theorem; Extremums: Necessary conditions, Sufficient conditions: Inverse and Implicit Functions; Lagrange multipliers and conditional extremums; Parametric problems.

MAT328 Analysis IV 4+2 7.0

Multiple Integrals: Double integrals, Measurable sets, Sets of measure zero, Properties of double integrals, The fubuni theorem, Multiple integrals and their properties, Coordinate transformations for triple integrals, Applications of multiple integrals, Improper Double integrals; The Gamma and Beta Functions; Curve integrals: First and second type curve integrals, Green's Theorem, Path independence of curve integrals and some applications; Surface integrals: Surfaces; Surface integrals of first and second type, Stokes? Theorem, Divergence Theorem, Some applications of surface integrals.

MAT365 Creativity and Innovation Management 2+0 2.0

MAT402 Real Analysis II 3+0 5.0

Lebesgue Integral: Simple Functions, Lebesgue integral of a simple function, the Lebesgue integral of a nonnegative function, Monotone convergence theorem, Fato u Lemma, the Lebesgue dominated convergence theorem, Comparison of the Lebesgue and Riemann Integrals, product measure and iterated integral; Lp Spaces: Riesz-Fischer theorem.

MAT403 Real Analysis I 3+0 5.0

Fundamentals of Real Analysis: Sets, Countable and uncountable sets, Real numbers, Extended real numbers, Metric spaces, Topological Spaces; Measure Theory: Semi rings, Algebras, Sigma Algebras and Borel Algebras on Family of Sets. Outer measure; Outer Measure Generated by Measure, Lebesgue measure; Function Defined on Family of Sets: Measurable functions and its properties.

MAT404 Functional Analysis II 3+0 5.0

Metric Spaces:Sequences, Cauchy sequences, Completeness, Separable metric spaces, Homeomorphism, Equivalence and isometry, Connected sets; Normed spaces: Definition of norm, Equivalent norms, Induced metrics of a norm, Examples of normed spaces, Banach spaces, Series in Banach spaces, Bounded linear transformations, Linear homeomorphism, Linear isometry, Finite dimensional normed linear spaces.

MAT405 Functional Analysis I 3+0 5.0

Bounded linear transformations, Norm of a bounded linear transformation, Bounded linear functionals, Dual spaces, Hahn-Banach theorem, Existence of bounded linear functionals; Inner product spaces: Norm on an Inner Product Space, Parallelogram Law on an inner product Space; Hilbert spaces: Properties of Hilbert Spaces, Orthogonality, Orthonormal sets, Gram-Schmidt orthogonalization process, Bessel's inequality, Parseval? identity.

MAT406 Geometric Topology 3+0 5.0

Derived Spaces: Product Spaces and Identification Spaces; Surfaces: Triangulation, Euler-Poincare Number; Topological Groups: Groups Acting on Sets, Orbit Spaces; Fundamental Group: Category, Functor, Product of Paths and Construction of Fundamental Group, Methods of Calculations, Seifert-Van Kampfen Theorem, Homotopy and Homotopy Invariance of Fundamental Group, Brauwer Fixed Point Theorem, Jordan Curve Theorem, Calculation of Fundamental Groups of Surfaces.

MAT406 (Eng) Geometric Topology 3+0 5.0

Derived Spaces: Product Spaces and Identification Spaces; Surfaces: Triangulation, Euler-Poincare Number; Topological Groups: Groups Acting on Sets, Orbit Spaces; Fundamental Group: Category, Functor, Product of Paths and Construction of Fundamental Group, Methods of Calculations, Seifert-Van Kampfen Theorem, Homotopy and Homotopy Invariance of Fundamental Group, Brauwer Fixed Point Theorem, Jordan Curve Theorem, Calculation of Fundamental Groups of Surfaces.

MAT407 Uniform Spaces 3+0 5.0

Uniformities and Uniform Spaces: Topology Induced by a Uniformity, Methods of generating uniformities on a set, Metrizable uniform spaces, Uniform continuity, Operations on uniform spaces; Totally Bounded and Complate Uniform Spaces: Subspaces of uniform space, product of uniform spaces, Totally boundedness of uniform spaces, Complete uniform spaces, Extension theorems and completion; Uniform Para-compact Spaces and Uniform Para-Lindelöf Spaces.

MAT407 (Eng) Uniform Spaces 3+0 5.0

Uniformities and Uniform Spaces: Topology Induced by a Uniformity, Methods of generating uniformities on a set, Metrizable uniform spaces, Uniform continuity, Operations on uniform spaces; Totally Bounded and Complate Uniform Spaces: Subspaces of uniform space, product of uniform spaces, Totally boundedness of uniform spaces, Complete uniform spaces, Extension theorems and completion; Uniform Para-compact Spaces and Uniform Para-Lindelöf Spaces.

MAT408 Vector Analysis 3+0 5.0

Vector Algebra: Basic Definitions, Vector Addition and Subtraction, Vector Products, Multiplication by Scalars, Triple Products; Vector functions of a single variable: Arc Length Angular Velocity: Angular Velocity of a Rigid Body, Derivative of a Moving Vector; Functions of Position: Scalar Functions of Several Variables, Line Integrals; Green's, Stoke's Theorems, Green's and Stokes theorems in a plane, Divergence Theorem.

MAT408 (Eng) Vector Analysis 3+0 5.0

Vector Algebra: Basic Definitions, Vector Addition and Subtraction, Vector Products, Multiplication by Scalars, Triple Products; Vector functions of a single variable: Arc Length Angular Velocity: Angular Velocity of a Rigid Body, Derivative of a Moving Vector; Functions of Position: Scalar Functions of Several Variables, Line Integrals; Green's, Stoke's Theorems, Green's and Stokes theorems in a plane, Divergence Theorem.

MAT409 Partial Differential Equations 3+0 5.0

Basic Concepts: A general classification of partial differential equations, Providing partial differential equations; First Order Partial Differential Equations: First order linear equations, First order semi-linear equations (Langrange Method), First order nonlinear equations (Charpit Method), First order nonlinear equations special types, Standard form to transform non linear equations; Higher Order Partial Differential Equations: Second order linear equations with constant coefficients, Separation of operators into reoccurring multiplier, Euler equations, Finding a special solution for non homogeneous linear equations

MAT409 (Eng) Partial Differential Equations 3+0 5.0

Basic Concepts: A general classification of partial differential equations, Providing partial differential equations; First Order Partial Differential Equations: First order linear equations, First order semi-linear equations (Langrange Method), First order nonlinear equations (Charpit Method), First order nonlinear equations special types, Standard form to transform non linear equations; Higher Order Partial Differential Equations: Second order linear equations with constant coefficients, Separation of operators into reoccurring multiplier, Euler equations, Finding a special solution for non homogeneous linear equations

MAT410 Game Theory 3+0 5.0

Examples of Games; Game Theory Notions; Two-Person Zero-Sum Games, Mixed strategies, Minmax (von Neumann) theorem, Equilibrium strategies, Solution of (nxm) games; Two-Person Non-Zero-Sum games, Nash theorem, Equilibrium strategies, Solution methods; Cooperative games; N-Person Games, Stable Sets, Non-Cooperative Games, Shapley value; Market Games and Oligopoly, M-N Market Game, Duopoly, Cournot equilibrium, Metagames.

MAT410 (Eng) Game Theory 3+0 5.0

Examples of Games; Game Theory Notions; Two-Person Zero-Sum Games, Mixed strategies, Minmax (von Neumann) theorem, Equilibrium strategies, Solution of (nxm) games; Two-Person Non-Zero-Sum games, Nash theorem, Equilibrium strategies, Solution methods; Cooperative games; N-Person Games, Stable Sets, Non-Cooperative Games, Shapley value; Market Games and Oligopoly, M-N Market Game, Duopoly, Cournot equilibrium, Metagames.

MAT412 Education of Axiomatic Geometry 3+0 5.0

Emergence of the notion of proof, Classification and synthesis of mathematical discoveries depending on their internal structures, The first axiomatization of geometry, Consistency and sufficiency, Discovery of failures in axiom systems, Variety of axioms, Discovery of non-enclidean geometries, Modernization and finalization of the enclidean geometry, Aspects of axiomatic geometry relevant for teaching.

MAT413 Fourier Analysis 3+0 5.0

Fourier Series: Basic concepts, Periodic functions, Trigonometric series, Even and odd functions, Half-range expansions, Complex Fourier series, Sturm-Liouville Theorem, A Fourier Theorem, Discussion of the theorem and its corollary, Uniform convergence of Fourier series, Differentiation and integratio of Fourier series, Fourier transform.

MAT413 (Eng) Fourier Analysis 3+0 5.0

Fourier Series: Basic concepts, Periodic functions, Trigonometric series, Even and odd functions, Half-range expansions, Complex Fourier series, Sturm-Liouville Theorem, A Fourier Theorem, Discussion of the theorem and its corollary, Uniform convergence of Fourier series, Differentiation and integratio of Fourier series, Fourier transform.

MAT414 Dynamical Systems 3+0 5.0

Linear systems: One dimensional linear systems, Two and more dimensional linear systems; Nonlinear systems; Fixed points, Stability of fixed points; Linearization, Periodicity, Stability of periodic points; Poincare-Bendixon theorem; Bifurcation; Sarkovskii's theorem; Chaos; Symbolic dynamics.

MAT414 (Eng) Dynamical Systems 3+0 5.0

Linear systems: One dimensional linear systems, Two and more dimensional linear systems; Nonlinear systems; Fixed points, Stability of fixed points; Linearization, Periodicity, Stability of periodic points; Poincare-Bendixon theorem; Bifurcation; Sarkovskii's theorem; Chaos; Symbolic dynamics.

MAT417 Calculus of Variations 3+0 5.0

Functions and their Differentials: Elementary problem of the calculus of variations, Euler's equation , Variation derivative, Some generalizations of the elementary problem of calculus variations, Isoperimetric problem, Conditional extremum, Weierstrass-Erdman's conditions, Variation problems with traveling boundary conditions, Canonical form of the Euler equation, Variation principles, Principle of least action, Hamilton- Jacobi equation, Second variation, Sufficient conditions for weak extremum, Legendre and Jacobi conditions.

MAT417 (Eng) Calculus of Variations 3+0 5.0

Functions and their Differentials: Elementary problem of the calculus of variations, Euler's equation , Variation derivative, Some generalizations of the elementary problem of calculus variations, Isoperimetric problem, Conditional extremum, Weierstrass-Erdman's conditions, Variation problems with traveling boundary conditions, Canonical form of the Euler

equation, Variation principles, Principle of least action, Hamilton- Jacobi equation, Second variation, Sufficient conditions for weak extremum, Legendre and Jacobi conditions.

MAT420 Tensor Analysis 3+0 5.0

Tensors: Transformation of coordinates, Einstein summation convention, Kronecker delta, Contravariant and covariant vectors, Tensors of higher rank; Tensor Operations: Inner and outer products, Contraction; Riemannian Space: Metric tensor, Raising and lowering of indices, Concept of length and angle; Covariant Differentiation: Levi-Civita tensor, Christoffel symbols, Geodesics, Geodesic coordinate system; Covariant Derivatives of Higher-Rank Tensors: Rules for covariant differentiation, Divergence of a tensor; Riemann Curvature Tensor: The Ricci tensor and the scalar curvature, The Einstein tensor; Some Applications of Tensors.

MAT422 Continuous Dynamical Systems 3+0 5.0

Basic Concepts: Continuous dynamical system, Equilibrium point, Periodic orbit; Linear Dynamical Systems: Linear dynamical systems in plane, Higher order linear dynamical systems; Nonlinear Dynamical Systems: Stability of equilibrium point, Linearization, Stability of periodic orbits, Poincare map, Attractors, Lorenz attractor, Lyapunov exponent; Stability of Dynamical Systems and Bifurcations.

MAT429 Galois Theory 3+0 5.0

Classical Algebra; Fundamental Theorem of Algebra; Factorization of Polinomials; Field Extensions; Simple Extension; The Degree of an Extension; Ruler and Compass Constructions; The Idea Behind Galois Theory; Normality and Separability; Field Otomorphisms; Galois Correspondence; Roots of Polynomials and Solvability by RadicalsClassical Algebra; Fundamental Theorem of Algebra; Factorization of Polinomials; Field Extensions; Simple Extension; The Degree of an Extension; Ruler and Compass Constructions; The Idea Behind Galois Theory; Normality and Separability; Field Otomorphisms; Galois Correspondence; Roots of Polynomials and Solvability by Radicals

MAT429 (Eng) Galois Theory 3+0 5.0

Classical Algebra; Fundamental Theorem of Algebra; Factorization of Polinomials; Field Extensions; Simple Extension; The Degree of an Extension; Ruler and Compass Constructions; The Idea Behind Galois Theory; Normality and Separability; Field Otomorphisms; Galois Correspondence; Roots of Polynomials and Solvability by RadicalsClassical Algebra; Fundamental Theorem of Algebra; Factorization of Polinomials; Field Extensions; Simple Extension; The Degree of an Extension; Ruler and Compass Constructions; The Idea Behind Galois Theory; Normality and Separability; Field Otomorphisms; Galois Correspondence; Roots of Polynomials and Solvability by Radicals

MAT430 Linear Differential Equations 3+0 5.0

Matrices: Eigen values and eigenvectors, Diagonalization, Canonical forms, Matrix exponentials; Linear Differential Equations: Discrete and continuous systems, General solutions, Initial value problem, The fundamental theorem for linear systems, linear systems in R^2; Stability: Hurwitz and Schur stability of matrices, Stability of solutions of differential equations, Asymptotic stability, Stability theorems.Matrices: Eigen values and eigenvectors, Diagonalization, Canonical forms, Matrix exponentials; Linear Differential Equations: Discrete and continuous systems, General solutions, Initial value problem, The fundamental theorem for linear systems, linear systems in R^2; Stability: Hurwitz and Schur stability of matrices, Stability of solutions of differential equations, Asymptotic stability, Stability theorems.

MAT430 (Eng) Linear Differential Equations 3+0 5.0

Matrices: Eigen values and eigenvectors, Diagonalization, Canonical forms, Matrix exponentials; Linear Differential Equations: Discrete and continuous systems, General solutions, Initial value problem, The fundamental theorem for linear systems, linear systems in R^2; Stability: Hurwitz and Schur stability of matrices, Stability of solutions of differential equations, Asymptotic stability, Stability theorems.Matrices: Eigen values and eigenvectors, Diagonalization, Canonical forms, Matrix exponentials; Linear Differential Equations: Discrete and continuous systems, General solutions, Initial value problem, The fundamental theorem for linear systems, linear systems in R^2; Stability: Hurwitz and Schur stability of matrices, Stability of solutions of differential equations, Asymptotic stability, Stability theorems.

MAT431 Introduction to Number Theory I 3+0 5.0

Natural Numbers: Peano aksiyoms;Divisibility Theory in the Integers: The division algorithm, The Greatest Common Divisor, The Euclidean Algorithm,The Diophantine Equation .; The Theory of Congruences:Basic properties of congruence, Special divisibility tests,Linear congruences,Chinese Remainder Theorem,Fermat's Theorem,Wilson's Theorem,Euler function and Euler's Theorem; Primitive Roots and Indices:The order of an integer modulo , Primitive roots for primes, Composite numbers having primitive roots,The tory of indices.

MAT431 (Eng) Introduction to Number Theory I 3+0 5.0

Natural Numbers: Peano aksiyoms;Divisibility Theory in the Integers: The division algorithm, The Greatest Common Divisor, The Euclidean Algorithm,The Diophantine Equation .; The Theory of Congruences:Basic properties of congruence, Special divisibility tests,Linear congruences,Chinese Remainder Theorem,Fermat's Theorem,Wilson's Theorem,Euler

function and Euler's Theorem; Primitive Roots and Indices:The order of an integer modulo , Primitive roots for primes, Composite numbers having primitive roots,The tory of indices.

MAT432 Introduction to Number Theory II 3+0 5.0

Quadratic residues; Euler?s Criterion; The Legendre symbol and its properties; The law of Quadratic Reciprocitiy; The Jacobi Symbol; Quadratic Congruences; Continued Fractions; Finite continued fractions; Infinite continued fractions; Continued fractions method for the solution of Diophantine equations; Pell?s equation; Transcendent Numbers; Irrationalities of Pi, Transcendentality of e

MAT432 (Eng) Introduction to Number Theory II 3+0 5.0

Quadratic residues; Euler?s Criterion; The Legendre symbol and its properties; The law of Quadratic Reciprocitiy; The Jacobi Symbol; Quadratic Congruences; Continued Fractions; Finite continued fractions; Infinite continued fractions; Continued fractions method for the solution of Diophantine equations; Pell?s equation; Transcendent Numbers; Irrationalities of Pi, Transcendentality of e

MAT433 Fractal Geometry I 3+0 5.0

Basic Concepts: Classical fractals, Self-similarity; Metric Spaces: Complete metric spaces, Contraction maps, Fixed point theorem; Hausdorff Distance; Iterated Function Systems: Finite iterated function systems (IFS), The notion of attractor, Countable iterated function systems (CIFS), Collage theorem and its applications; Graph-directed Fractals: Directed-graphs, Graph-directed iterated function systems (GIFS).Basic Concepts: Classical fractals, Self-similarity; Metric Spaces: Complete metric spaces, Contraction maps, Fixed point theorem; Hausdorff Distance; Iterated Function Systems: Finite iterated function systems (IFS), The notion of attractor, Countable iterated function systems (CIFS), Collage theorem and its applications; Graph-directed Fractals: Directed-graphs, Graph-directed iterated function systems (GIFS).

MAT433 (Eng) Fractal Geometry I 3+0 5.0

Basic Concepts: Classical fractals, Self-similarity; Metric Spaces: Complete metric spaces, Contraction maps, Fixed point theorem; Hausdorff Distance; Iterated Function Systems: Finite iterated function systems (IFS), The notion of attractor, Countable iterated function systems (CIFS), Collage theorem and its applications; Graph-directed Fractals: Directed-graphs, Graph-directed iterated function systems (GIFS).Basic Concepts: Classical fractals, Self-similarity; Metric Spaces: Complete metric spaces, Contraction maps, Fixed point theorem; Hausdorff Distance; Iterated Function Systems: Finite iterated function systems (IFS), The notion of attractor, Countable iterated function systems (CIFS), Collage theorem and its applications; Graph-directed Fractals: Directed-graphs, Graph-directed iterated function systems (GIFS).

MAT434 Fractal Geometry II 3+0 5.0

Space-Filling Curves: Peano curve, Hilbert curve; Fractal Dimension: Topological dimension, Box-counting dimension, Hausdorff measure and Hausdorff dimension; Open Set Condition for Iterated Function Systems (IFS); Iteration of Complex Functions: Parametric spaces, Mandelbrot set, Julia sets, Computation methods for Julia sets; Interpolation: Interpolation functions, Fractal interpolation functions.Space-Filling Curves: Peano curve, Hilbert curve; Fractal Dimension: Topological dimension, Box-counting dimension, Hausdorff measure and Hausdorff dimension; Open Set Condition for Iterated Function Systems (IFS); Iteration of Complex Functions: Parametric spaces, Mandelbrot set, Julia sets, Computation methods for Julia sets; Interpolation: Interpolation functions, Fractal interpolation functions.

MAT434 (Eng) Fractal Geometry II 3+0 5.0

Space-Filling Curves: Peano curve, Hilbert curve; Fractal Dimension: Topological dimension, Box-counting dimension, Hausdorff measure and Hausdorff dimension; Open Set Condition for Iterated Function Systems (IFS); Iteration of Complex Functions: Parametric spaces, Mandelbrot set, Julia sets, Computation methods for Julia sets; Interpolation: Interpolation functions, Fractal interpolation functions.Space-Filling Curves: Peano curve, Hilbert curve; Fractal Dimension: Topological dimension, Box-counting dimension, Hausdorff measure and Hausdorff dimension; Open Set Condition for Iterated Function Systems (IFS); Iteration of Complex Functions: Parametric spaces, Mandelbrot set, Julia sets, Computation methods for Julia sets; Interpolation: Interpolation functions, Fractal interpolation functions.

MAT435 Discrete Dynamical Systems 3+0 5.0

Concept and Examples of Discrete Dynamical System; Fixed points: Existence of fixed points, Stability of fixed points; Periodic Points: Existence of periodic points and Sharkovsky?s theorem, Stability of periodic points; Chaotic Dynamical Systems: Sensitive dependence on initial conditions, Lyapunov exponent, Topological conjugacy, Examples of chaotic dynamical systems.

MAT436 Introduction to Perturbation Methods 3+0 5.0

Introduction: Regular problem, Singular problem, Order symbols, Fundamental theorem of perturbation theory, Asymptotic sequences; Roots of Polynomials; Singular Perturbation in Ordinary Differential Equations; Periodic solutions: Poincare method; Introduction to the two-scale method: The damped linear oscillator, Nonlinear damping; WKB approximation: WKB approximation for high frequencies, WKB approximation for non-oscillatory solutions; Transition Point Problems and Langer's Method of Uniform Approximation.

MAT436 (Eng) Introduction to Perturbation Methods 3+0 5.0

Introduction: Regular problem, Singular problem, Order symbols, Fundamental theorem of perturbation theory, Asymptotic sequences; Roots of Polynomials; Singular Perturbation in Ordinary Differential Equations; Periodic solutions: Poincare method; Introduction to the two-scale method: The damped linear oscillator, Nonlinear damping; WKB approximation: WKB approximation for high frequencies, WKB approximation for non-oscillatory solutions; Transition Point Problems and Langer's Method of Uniform Approximation.

MAT437 Mathematics Project 0+3 6.0

Constructions of numbers: Applications of complex numbers and quaternions; Axiomatic Geometry: Reality of NonEuclidean Geometries and their role in physical theories; Physical Application Examples of Differential Equations: Kepler's orbits, Brachistochrone and cycloid curves; Short Proofs of Important Theorems of Analysis by Geometric Reasoning; Applications of Notions of Number and Figure in Primary and Secondary School Education: Construction of models facilitating mathematical insight; Selected Topics from History of Mathematics: Examples of historical and present-day applications of great mathematical discoveries.Constructions of numbers: Applications of complex numbers and quaternions; Axiomatic Geometry: Reality of NonEuclidean Geometries and their role in physical theories; Physical Application Examples of Differential Equations: Kepler's orbits, Brachistochrone and cycloid curves; Short Proofs of Important Theorems of Analysis by Geometric Reasoning; Applications of Notions of Number and Figure in Primary and Secondary School Education: Construction of models facilitating mathematical insight; Selected Topics from History of Mathematics: Examples of historical and present-day applications of great mathematical discoveries.

MAT437 (Eng) Mathematics Project 0+3 6.0

Constructions of numbers: Applications of complex numbers and quaternions; Axiomatic Geometry: Reality of NonEuclidean Geometries and their role in physical theories; Physical Application Examples of Differential Equations: Kepler's orbits, Brachistochrone and cycloid curves; Short Proofs of Important Theorems of Analysis by Geometric Reasoning; Applications of Notions of Number and Figure in Primary and Secondary School Education: Construction of models facilitating mathematical insight; Selected Topics from History of Mathematics: Examples of historical and present-day applications of great mathematical discoveries.Constructions of numbers: Applications of complex numbers and quaternions; Axiomatic Geometry: Reality of NonEuclidean Geometries and their role in physical theories; Physical Application Examples of Differential Equations: Kepler's orbits, Brachistochrone and cycloid curves; Short Proofs of Important Theorems of Analysis by Geometric Reasoning; Applications of Notions of Number and Figure in Primary and Secondary School Education: Construction of models facilitating mathematical insight; Selected Topics from History of Mathematics: Examples of historical and present-day applications of great mathematical discoveries.

MAT452 Applications of Partial Differential Equations 3+0 5.0

Classification of Second Order Almost-Linear Equations, Canonical Forms of Almost-Linear Equations; Some Special Cases of Second-Order Linear Equations With Variable Coefficients; Reduction of Order in Second-Order Linear Equations; Introduction to the Wave Equation; Initial Value Problem for one Dimensional Homogeneous Wave Equation; The Vibrating String; Separation of Variables Method; Separation of Variables of the one Dimensional Wave Equation; Two Dimensional Wave Equation in the Rectangular Domain; Solution of the Two Dimensional Homogeneous Wave Equation in Polar Coordinates; Separation of Variables Solutions of the One Dimensional Heat Equation; Heat Flow in Rectangular Domain; Separation of Variables Solutions of the Laplace Equation; Solution of the Laplace Equation in Polar Coordinates.Classification of Second Order Almost-Linear Equations, Canonical Forms of Almost-Linear Equations; Some Special Cases of Second-Order Linear Equations With Variable Coefficients; Reduction of Order in Second-Order Linear Equations; Introduction to the Wave Equation; Initial Value Problem for one Dimensional Homogeneous Wave Equation; The Vibrating String; Separation of Variables Method; Separation of Variables of the one Dimensional Wave Equation; Two Dimensional Wave Equation in the Rectangular Domain; Solution of the Two Dimensional Homogeneous Wave Equation in Polar Coordinates; Separation of Variables Solutions of the One Dimensional Heat Equation; Heat Flow in Rectangular Domain; Separation of Variables Solutions of the Laplace Equation; Solution of the Laplace Equation in Polar Coordinates.

MAT452 (Eng) Applications of Partial Differential Equations 3+0 5.0

Classification of Second Order Almost-Linear Equations, Canonical Forms of Almost-Linear Equations; Some Special Cases of Second-Order Linear Equations With Variable Coefficients; Reduction of Order in Second-Order Linear Equations; Introduction to the Wave Equation; Initial Value Problem for one Dimensional Homogeneous Wave Equation; The Vibrating String; Separation of Variables Method; Separation of Variables of the one Dimensional Wave Equation; Two Dimensional Wave Equation in the Rectangular Domain; Solution of the Two Dimensional Homogeneous Wave Equation in Polar Coordinates; Separation of Variables Solutions of the One Dimensional Heat Equation; Heat Flow in Rectangular Domain; Separation of Variables Solutions of the Laplace Equation; Solution of the Laplace Equation in Polar Coordinates.Classification of Second Order Almost-Linear Equations, Canonical Forms of Almost-Linear Equations; Some Special Cases of Second-Order Linear Equations With Variable Coefficients; Reduction of Order in Second-Order Linear Equations; Introduction to the Wave Equation; Initial Value Problem for one Dimensional Homogeneous Wave Equation; The Vibrating String; Separation of Variables Method; Separation of Variables of the one Dimensional Wave Equation; Two Dimensional Wave Equation in the Rectangular Domain; Solution of the Two Dimensional Homogeneous Wave Equation in Polar Coordinates; Separation of Variables Solutions of the One Dimensional Heat Equation; Heat Flow in

Rectangular Domain; Separation of Variables Solutions of the Laplace Equation; Solution of the Laplace Equation in Polar Coordinates.

MAT453 Linear Programming 3+0 5.0

Introduction to Linear Programming: Practical models, Basic notions, Geometric interpretation, Canonical form of the linear programming problem, Initial and dual problem, Basic theorems, Extremal points and their algebraic characterization, Regular extremal points Simplex Algorithm: Simplex algorithm, The initial extremal points; finding methods, Non-regular problems and their solution methods; Solution Method for Initial and Dual Problems; Solution of the Integer Linear Programming Problem: Solution of the Integer Linear Programming Problem, Finding solution by cutting off method.Introduction to Linear Programming: Practical models, Basic notions, Geometric interpretation, Canonical form of the linear programming problem, Initial and dual problem, Basic theorems, Extremal points and their algebraic characterization, Regular extremal points Simplex Algorithm: Simplex algorithm, The initial extremal points; finding methods, Non-regular problems and their solution methods; Solution Method for Initial and Dual Problems; Solution of the Integer Linear Programming Problem: Solution of the Integer Linear Programming Problem, Finding solution by cutting off method.

MAT453 (Eng) Linear Programming 3+0 5.0

Introduction to Linear Programming: Practical models, Basic notions, Geometric interpretation, Canonical form of the linear programming problem, Initial and dual problem, Basic theorems, Extremal points and their algebraic characterization, Regular extremal points Simplex Algorithm: Simplex algorithm, The initial extremal points; finding methods, Non-regular problems and their solution methods; Solution Method for Initial and Dual Problems; Solution of the Integer Linear Programming Problem: Solution of the Integer Linear Programming Problem, Finding solution by cutting off method.Introduction to Linear Programming: Practical models, Basic notions, Geometric interpretation, Canonical form of the linear programming problem, Initial and dual problem, Basic theorems, Extremal points and their algebraic characterization, Regular extremal points Simplex Algorithm: Simplex algorithm, The initial extremal points; finding methods, Non-regular problems and their solution methods; Solution Method for Initial and Dual Problems; Solution of the Integer Linear Programming Problem: Solution of the Integer Linear Programming Problem, Finding solution by cutting off method.

MAT817 Calculus Laboratory I 0+2 2.0

Introduction to Maple: Maple as a calculator, Assigning variables, Basic commands; Equations of Lines and Parabolas: Equations of lines, Equations of parabolas, Vertex, focus and directrix; Defining and Graphing Functions with Maple: Sums, differences, products, quotients and multiples, Composite and piecewise defined functions, Graphs of functions; Polynomial and Rational Functions: Roots, Graphs; Using Maple to Calculate Limits: Approximations, Limits of functions, One-sided limits; Continuity: Identifying continuous and discontinuous functions by their graphs, The intermediate-value theorem and its applications; Differentiation: Tangent and normal lines and their graphs, Using Maple to calculate differentiation, Higher-order derivatives, Implicit differentiation, Linear approximations; Elementary Functions: Exponential and logarithmic functions, Hyperbolic functions.Introduction to Maple: Maple as a calculator, Assigning variables, Basic commands; Equations of Lines and Parabolas: Equations of lines, Equations of parabolas, Vertex, focus and directrix; Defining and Graphing Functions with Maple: Sums, differences, products, quotients and multiples, Composite and piecewise defined functions, Graphs of functions; Polynomial and Rational Functions: Roots, Graphs; Using Maple to Calculate Limits: Approximations, Limits of functions, One-sided limits; Continuity: Identifying continuous and discontinuous functions by their graphs, The intermediate-value theorem and its applications; Differentiation: Tangent and normal lines and their graphs, Using Maple to calculate differentiation, Higher-order derivatives, Implicit differentiation, Linear approximations; Elementary Functions: Exponential and logarithmic functions, Hyperbolic functions.

MAT818 Calculus Laboratory II 0+2 2.0

Applications of Differentiation with Maple: Related rates, Concavity, Increasing-decreasing functions, Linear approximations, Taylor polynomials; Integration: Sums and limits of sums, Visualizing Riemann sums, The computation of definite integrals, Mean-value theorem for integrals; Indefinite Integrals and Integration Techniques; Applications of Integration: Area, Visualizing Solids of revolution, Volume, Arc length and surface area.Applications of Differentiation with Maple: Related rates, Concavity, Increasing-decreasing functions, Linear approximations, Taylor polynomials; Integration: Sums and limits of sums, Visualizing Riemann sums, The computation of definite integrals, Mean-value theorem for integrals; Indefinite Integrals and Integration Techniques; Applications of Integration: Area, Visualizing Solids of revolution, Volume, Arc length and surface area.

MEK301 Theoretical Mechanics I 4+0 6.0

Coordinate Systems: Scalars and vectors, basic operations on vectors, Derivative and partial derivative on vectors, Integrals of vectors, Line integral, Cartesian, polar, cylindrical and spherical coordinates, Particle kinematics; Newton's Laws of Motion: Work done, energy and momentum, Newton's laws; Reference Frames and Relative Motion: Motion in a constant force field, Motion in central force field; Moving coordinate systems: Rotating Coordinate Systems.

MEK302 Theoretical Mechanics II 4+0 6.0

Virtual work principle, D'Alembert principle; Noncontinuous and continuous systems; Degree of freedom and constraints, Dimensional Motion of Rigid Bodies: Euler's Theorem, Moment of inertia, Gyration radius; Rotational Dynamics: work and power, Physical pendulum, Rotational Motion of Rigid Bodies: Rotational kinetic energy, main inertial axis, Euler's equations of Motion; Lagrange equations, Hamilton equations; System of Variable Mass: Newton's second law in the systems of variable mass, velocity and acceleration equations in the system of variable mass.

MEK308 Fluid Mechanics 2+0 3.0

Properties of Matter; Fluids; Pressure in Fluid and Density, Elasticity Modulus; Viscosity; Stress and Strain; Young Modulus; Variation of Pressure in Fluid at Rest, Viscous Fluids; Principle of Pascal's and Archimedes Principle; Measurement of Fluid Pressure; Fluid Dynamics; Equation of Continuity, Torricelli's Theorem; Bernoulli Equation; Applications of the Equations of Bernoulli and Continuity; Venturi Meter; Pitot Tube.

MUH302 Analysis of Financial Reports 3+0 4.5

Fundamental Financial Statements: Balance sheet, Income statement; Comparative Statements Analysis Method: Preparation of statements, Analysis and interpretation; Percentage Analysis Method: Preparation of statements, Analysis and interpretation; Trend Analysis Method: Preparation of statements, Analysis and interpretation; Fund Cash Flow Analysis: Preparation of statements, Analysis and interpretation; Change in Net Working Capital Statement: Preparation of statements, Analysis and interpretation; Ratio Analysis: Analysis and interpretation of liquidity, financial structure activity and profitability ratios.

MÜZ151 Short History of Music 2+0 3.0

Mile Stones in the History of Music; Music of the Antique Period; Music of Far East; Music of Anatolia; Music of the Middle Ages: Gregorian Chants; Music of Renaissance: Bach and Handel; Music of the Classical Age; Pianoforte in the Classical Age; Romantic Age; Nationalist Movement; Contemporary Music; Nationalism and Universality.

MÜZ155 Turkish Folk Music 2+0 2.0

Folk songs from different Regions of Turkey are Taught; Aegean Region Zeybek Folk Songs: Eklemedir koca konak, Ah bir ateş ver, Çökertme, Kütahya'nın pınarları, Çemberinde gül oya; Kars Region Azerbaijani Folk Songs: Bu gala daşlı gala, Yollarına baka baka, Dağlar gızı Reyhan, Ayrılık, Dut ağacı boyunca; Central Anatolian Region Folk Songs: Seherde bir bağa girdim, Uzun ince bir yoldayım, Güzelliğin on para etmez, Mihriban ve Acem kızı; Southeastern Anatolian Region; Urfa and Diyarbakır Folk Songs: Allı turnam, Urfanın etrafı, Mardin kapısından atlayamadım, Fırat türküsü, Evlerinin önü kuyu; Blacksea Region; Trabzon, Rize, Artvin Folk Songs: Maçka yolları taşlı, Ben giderim Batuma, Dere geliyor dere.

MÜZ157 Traditional Turkish Art Music 2+0 2.0

Description of Traditional Art Music: Basic concepts, Characteristics, Types, Notes, Instruments; The Mode System of Traditional Turkish Art Music; The Rhythmic Pattern of Traditional Turkish Art Music; Samples from Different Modes; Samples from Different Rhythmic Patterns.

NÜM308 Numerical Analysis I 2+2 5.0

Errors and Mistakes; Numerical Methods for Solution of Nonlinear Equations: Simple iteration, Newton - Raphson, Cuts and Halfway Through Methods; Simple Iteration and Newton'Raphson Methods for System Equations; Finite Difference Equations; Interpolation: Linear, Quadratic, Lagrange's, Legandre's, Spline Interpolations; Numerical Integration: Trapezoidal Rule, Simpson's Rule, Gauss Integration Formulas.

PZL211 (Eng) Principles of Marketing 3+0 5.0

Marketing: Scope, Evolution of Marketing; Marketing Environment; Marketing Research and Marketing Information Systems; Market Segmentation; Selecting Target Markets; Elements of Marketing Mix: Product, Price, Distribution channels, Promotion; Organization of Marketing Activities; International Marketing.Marketing: Scope, Evolution of Marketing; Marketing Environment; Marketing Research and Marketing Information Systems; Market Segmentation; Selecting Target Markets; Elements of Marketing Mix: Product, Price, Distribution channels, Promotion; Organization of Marketing Activities.

PZL453 (Eng) Marketing Research 3+0 4.5

Marketing Problems in Businesses; Basic Classification of Marketing Research; Definition of Marketing Research; Implementation and Limitations of Marketing Research; Disciplines Relevant to Marketing Research; Categories of Marketing Research; Methodology in Marketing Research: Defining the problem, Situation Analysis, Determining Sources of Data , Data Collection Techniques; Sampling; Data Tabulation; Analysis of the Data; Interpreting the Results.Marketing Problems in Businesses; Basic Classification of Marketing Research; Definition of Marketing Research; Implementation and Limitations of Marketing Research; Disciplines Relevant to Marketing Research; Categories of Marketing Research; Methodology in Marketing Research: Defining the problem, Situation Analysis, Determining Sources of Data , Data Collection Techniques; Sampling; Data Tabulation; Analysis of the Data; Interpreting the Results.

SAĞ222 First Aid 2+1 3.0

Social Importance of First Aid; Aims of First Aid; Precautions to be Taken by First Aid Providers; Human Body; First Aid Materials; Strangulations and Supplying Respiration; Stopping Bleedings and Supplying Blood Circulation: External and internal bleeding signs and first aid, First aid and recognition of loss of consciousness, Causes of shock and recognition of shock due to bleeding and first aid; Degrees of Coma and First Aid; First Aid in Heart Failure; Applying Cardiopulmonary Resuscitation (CPR) and Artificial Respiration Together; Types of Injury and First Aid; Burn and Boils; Fractures; Dislocations and Spraining; Poisonings; Freezing; Hot and Electric Shocks.

SAN155 Hall Dances 0+2 2.0

Basic concepts. The ethics of dance, Dance Nights, Dance Costumes, National International Competitions and rules/grading, Basic Definitions, Classifications of Dances: Social Dances; Salsa, Cha Cha, Samba, Mambo, Jive, Rock'n Roll, Jazz, Merenge; Flamenko, Rumba, Passa -Doble, Argentina tango, Vals, Disco, Quickstep, Foxtrot, Bolero, European Tango: Ballroom Dances; Sportive Dances; Latin American Dances; Samba, Rumba, Jive, Passa-Doble, Cha Cha, Standart Dances; European Tango, Slow vals (English), Viyana vals, Slow foxtrot, Quickstep.

SEK230 Speed Reading Techniques and Shorthand 1+1 3.0

Shorthand; Ability of Use Shorthand in the Office; Speed Reading and Techniques of Developing faster Reading Skills for the Office; Developing Memory Skills and Recall Techniques; Skimming and Scanning in Reading.

SNT155 History of Art 2+0 2.0

History of Civilization and Evolution of Art: Prehistory to Present; Concepts and Terminology in Art with Samples; Interrelation among Art-Religion and Society; Effects of Religion on Artistic Development; Reflections and Interpretations of Judaism, Christianity and Islam on Art; Renaissance: Emergence, Effects, Artists, Works of Art; Architecture and Plastic Arts; Art in the 19th and 20th Centuries: Relevanceof the main historical events of the period.

SOS155 Folkdance 2+0 2.0

Dance in Primitive Cultures; Dance in Earlier Civilizations; Dance in the Middle Age and Renaissance; Dance in the 18th and 19th Centuries; Dances of the 20th Century; Ballet; Turkish Dances; Emergence of Folkdance; Anatolian Folkdance: Classification, Accompanying instruments; Methods and Techniques of Collecting Folkdance; Problems in Collecting Folkdance; Teaching of Folkdance; Adapting Folkdance for Stage: Stage, Stage aesthetics and Choreography, Orientation and choreography.

TAR165 Atatürk's Principles and History of Turkish Revolution I 2+0 2.0

Reform efforts of Ottoman State, General glance to the stagnation period, Reform searching in Turkey, Tanzimat Ferman and its bringing, The Era of Constitutional Monarchy in Turkey, Policy making during the era of first Constitutional Monarchy, Europe and Turkey, 1838-1914, Europe from imperialism to World War I, Turkey from Mudros to Lausanne, Carrying out of Eastern Question, Turkish Grand National Assembly and Political construction 1920-1923, Economic developments from Ottomans to Republic, The Proclamation of New Turkish State, from Lausanne to Republic.

TAR166 Atatürk's Principles and History of Turkish Revolution II 2+0 2.0

The Restructuring Period; The Emergence of the fundamental policies in the Republic of Turkey (1923-1938 Period); Atatürk's Principles, and Studies on Language, History and Culture in the period of Atatürk; Turkish Foreign Policy and Application Principles in the period of Atatürk; Economic Developments from 1938 to 2002; 1938-2002 Period in Turkish Foreign Policy; Turkey after Atatürk's period; Social, Cultural and Artistic Changes and Developments from 1938 to Present.

TAR201 History of Science 2+0 2.5

Science in Ancient Civilisations: Egypt and Mesopotamia, Antique Greece and Hellenistic Period, The Roman Civilisation; Science in the Middle Ages in Europe and Islamic World; Renaissance and Modern Science: Astronomy, Chemistry, Medicine, Biology, Physics, Mathematics, Galileo Galilei, Newton; The Age of Enlightenment: Astronomy, Mathematics and Physics in the 18th Century; The Industrial Revolution; Modern Science: Einstein's Revolution, Quantum Theory; Appearance of Atom Physics; Science today.

TER206 Thermodynamics 4+0 5.0

Temperature, Thermal Expansion and Ideal Gases: Temperature and the zeros law of thermodynamics, Thermometers and temperature scales, Thermal expansion of solids and liquids, Macroscopic description of an ideal gas; Heat and the First Law of Thermodynamics: Heat and thermal energy, Heat capacity and specific heat, Work and heat in thermodynamic processes, The first law of thermodynamics, Heat transfer; The Kinetic Theory of Gases: Molecular model of pressure in an ideal gas, Molecular interpretation of temperature, Heat capacity of an ideal gas; Heat Engines, Entropy and the Second Law of Thermodynamics: Heat engines and the second law of thermodynamics, the Carnot engine, Entropy and disorder.

THU203 Community Services 0+2 3.0

Various Community Projects: Helping young students during their study periods or after school study sessions, Aiding the elderly in nursing homes, helping disabled individuals with various tasks, helping social services and aiding children with their education etc., take part in the projects which raise environmental awareness, Integrating with the community and enabling use of knowledge accumulated in the courses.

TİY152 Theatre 2+0 2.5

Theatre as a Cultural Institution: Relation of culture and theatre; The Place and Importance of Theatre in Culture; Theatre as a Communication Art: Definition of theatre, Origin and evolution of theatre, Aesthetic communication; Elements of Communication in Theatre: Decor, Costume, Stage, Actor, Director; Theatre Management: Historical development, Administration and Organization; Art Sociology: Theatre and society; Reflections of Cultural Issues in Turkish Plays.Reflections of Cultural Issues in Turkish Plays.

TKY302 Quality Control 3+0 4.5

Quality Development and Quality Control: Quality development and dimensions of its concept, Probability and statistics in quality control; Quality Control in Total Quality Management; Statistical Methods Used in Quality Control: Variations and its measurement, Important batch and continuous dispersion, Sampling dispersions, Parameter estimate and hypothesis tests; Statistical Process Control (SPC): Philosophy of SPC and methods, Practice, Control charts for attributable and quantity variables, Other statistical process control methods, Process ability analysis, Acceptance (consent) sampling and sampling plans, Various quality standards.Quality Development and Quality Control: Quality development and dimensions of its concept, Probability and statistics in quality control; Quality Control in Total Quality Management; Statistical Methods Used in Quality Control: Variations and its measurement, Important batch and continuous dispersion, Sampling dispersions, Parameter estimate and hypothesis tests; Statistical Process Control (SPC): Philosophy of SPC and methods, Practice, Control charts for attributable and quantity variables, Other statistical process control methods, Process ability analysis, Acceptance (consent) sampling and sampling plans, Various quality standards.

TKY302 (Eng) Quality Control 3+0 4.5

Quality Development and Quality Control: Quality development and dimensions of its concept, Probability and statistics in quality control; Quality Control in Total Quality Management; Statistical Methods Used in Quality Control: Variations and its measurement, Important batch and continuous dispersion, Sampling dispersions, Parameter estimate and hypothesis tests; Statistical Process Control (SPC): Philosophy of SPC and methods, Practice, Control charts for attributable and quantity variables, Other statistical process control methods, Process ability analysis, Acceptance (consent) sampling and sampling plans, Various quality standards.Quality Development and Quality Control: Quality development and dimensions of its concept, Probability and statistics in quality control; Quality Control in Total Quality Management; Statistical Methods Used in Quality Control: Variations and its measurement, Important batch and continuous dispersion, Sampling dispersions, Parameter estimate and hypothesis tests; Statistical Process Control (SPC): Philosophy of SPC and methods, Practice, Control charts for attributable and quantity variables, Other statistical process control methods, Process ability analysis, Acceptance (consent) sampling and sampling plans, Various quality standards.

TKY404 Quality Management System 2+0 3.0

Quality Definition and Terms; Quality Philosophy: Principles of quality philosophy; Total Quality Management; Quality Costs; Simple Problem Solving Techniques: Brainstorming, Check sheets, Histogram, Pareto analysis, Scatter plots, Box plot; Quality Control; Statistical Quality Control: Variable control charts, Attribute control charts; Standardization and Standards; Quality Assurance Systems and ISO 9000 Standards.

TKY409 Industrial Quality Systems 2+0 3.0

Concept of Quality: Content of quality concept, Customer, Cost, Delivery; Laboratory Management Systems and Safety in Laboratory; Preparation of Working Instructions, Procedures, Equipment Use Training Notes; Laboratory Management: 5S; Total Perfect Management (TPM); Design of Experiments: Taguchi; Statistical Process Control: Control schemes, 6 sigma; Problem-Solving Techniques: Ishikawa diagrams, Why-why analysis, Pareto.

TÜR120 Turkish Sign Language 3+0 3.0

Overview of Sign Language: Characteristics of sign language; History of Sign Language in the World: Emergence of language and sign language, Verbal education and approaches to sign language; History of Turkish Sign Language: Early period, Ottoman period, Period of the Republic of Turkey; Introduction to Turkish Sign Language: Finger alphabet, Pronouns, Introducing oneself and family, Greetings, Meeting, Relationship words; Showing Basic Words: Adjectives: Adjectives of quality, Adjectives of quantity; Verbs: Present tense, Past tense, Future tense, Time adverbs, Antonyms; Healthy Living: Expression of health-related problems, Sports terms, Expressing requirements; In a Bank: Expressions required to carry out basic procedures in a bank; Vacation: Basic words about vacation.

TÜR125 Turkish Language I 2+0 2.0

Language: Characteristics of language, Relationship between language and thought and language and emotion, Theories about the origin of languages, Language types, The position of Turkish Language among world languages; Relationship Between Language and Culture; Historical Progress of the Turkish Language; Alphabets Used for Writing in Turkish;

Turkish Language Studies; Turkish Language Reform; Phonetics; Morphology and Syntax; The Interaction of Turkish Language with Other Languages; Wealth of Turkish Language; Problems Facing Turkish Language; Derivation of Terms and Words; Disorders of Oral and Written Expression.

TÜR126 Turkish Language II 2+0 2.0

Composition: Written composition, Paragraph and ways of expression in paragraphs; Punctuation; Spelling Rules; Types of Written Expression and Practices I: Expository writing; Types of Written Expression and Practices II: Narrative writing; Academic Writing and Types of Correspondence; Reading and Listening: Reading, Reading comprehension strategies, Critical reading; Listening; Relationship between Listening and Reading; Oral Expression: Basic principles of effective speech; Body Language and the Role of Body Language in Oral Expression; Speech Types; Principles and Techniques of Effective Presentation; Some Articulatory Features of Oral Expression.