GRADUATE SCHOOL OF HEALTH SCIENCES

The Institute is established at the Anadolu University by the law published on Resmi Gazete issue 21672 on 18th August, 1993 and began postgraduate education at the spring semester of 1993-1994. In addition to the courses for Doctorate and Master of Sciences related to departments of Faculty of Pharmacy, other programmes were included after the establishment of the institute. Department of Physical Education and Sport began postgraduate education at the spring semester of 1994-1995; and Department of Speech and Language Pathology began postgraduate education at the spring semester of 2000-2001 and Department of Biochemistry at the spring semester of 2001-2002.

Director : Prof. Dr. Dilek AK
Deputy Director : Prof. Dr. Betül DEMİRCİ
Deputy Director : Assoc. Prof. Dr. M. Dilek ALTINTOP
Secretary of Institute : Osman Nuri KIDAK

STAFF

Professors: Dilek AK, Betül DEMİRCİ, Fatih DEMİRCİ, Zafer Asım KAPLANCIKLI, Zekiye Melek KÜÇÜKATAY, Yavuz YAKUT

Associate Professors: M. Dilek ALTINTOP

Assistant professors: Demet İlhan

DEPARTMENT OF ANALYTICAL CHEMISTRY

The Department of Analytical Chemistry was activated at the Faculty of Pharmacy in 1985 and has contributed to the education for Master Science (M.Sc.) and Doctorate (Ph.D.) degrees at Graduate Institute of Health Sciences since 1993. 2 Fulltime professors, 2 associate professors and 5 research assistants are currently working at the department. It is governed by a chairman and the decision related with the department is made by the department council which is composed of all members of the department.

Head : Prof. Dr. Dilek AK

DOCTORATE DEGREE (PH.D)

PROGRAM

	I. SEMESTER				II. SEMESTER		
KİM 627	Polarography	3+0	7,5	KİM 604	Seminar	3+0	7,5
	Elective Courses (3)	-	22,5	KİM 629	Applications of Voltammetric Techniques	3+0	7,5
			30,0		*Elective Courses (2)*	-	15,0
							30,0
	III. SEMESTER				**IV. SEMESTER**		
	Elective Courses (4)	-	30,0	KİM 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0				30,0

V. SEMESTER

KİM 890	Thesis	0+1	30,0
			30,0

VI. SEMESTER

KİM 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

KİM 626	Physicochemical Experiments	3+0	7,5
KİM 628	Capillary Electrophoresis	3+0	7,5
KİM 638	Non-aqueous Media Titrations	3+0	7,5
KİM 639	Food Analyses Methods	3+0	7,5
KİM 653	Conductometry and Potentiometry	3+0	7,5
KİM 655	High Pressure Liquid Chromatography and Applications	3+0	7,5
KİM 660	The Analytical Methods for the Determination of Antioxidant Activity	3+0	7,5
KİM 661	Liquid Chromatography-Mass Spectrometry (LC/MS) and its Applications	3+0	7,5
KİM 662	Column Technologies in Liquid Chromatography	3+0	7,5
KİM 663	Bioanalytical Sample Preparation Techniques	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UKİ 901	Research in Area of Specialization	5+0	7,5
UKİ 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

KİM 544	Stochiometry and Solutions	3+0	7,5
KİM 545	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

II. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

III. SEMESTER

KİM 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

KİM 541	Instrumental Analysis I	3+0	7,5
KİM 542	Instrumental Analysis II	3+0	7,5
KİM 546	Techniques in Laboratory	3+0	7,5
KİM 548	Principles of Analytical Chemistry	3+0	7,5
KİM 553	Basic Analysis Methods	3+0	7,5
KİM 554	Usage of Analytical Methods for the Food Safety	3+0	7,5
KİM 555	Inorganic Analysis	3+0	7,5
KİM 556	Drug Analysis in Biological Fluids	3+0	7,5
KİM 557	Introduction to Separation Methods	3+0	7,5
KİM 559	Theoretical and Practical Aspects of Experimental Design in Analytical Chemistry	3+0	7,5
KİM 572	Method Validation in Analytical Chemistry	3+0	7,5
KİM 574	Chemometric Techniques for Quantitative Analysis	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UKİ 701	Research in Area of Specialization	3+0	4,5
UKİ 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF BIOCHEMISTRY

Postgraduate education at the Department of Biochemistry first began at the spring semester of 2001-2002. It has contributed to the education for Master Science (M.Sc.) at Graduate Institute of Health Sciences. As being a recently established department, Department of Biochemistry is rapidly establishing and improving its facilities and research laboratories. The department currently has one associate professor,one assistant professor and 2 research assistant.

Head : Prof. Dr. Zerrin SELLER

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

BYK 601	Cell Biochemistry	3+0	7,5
BYK 603	Oxygen Radicals in Biological Systems	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

II. SEMESTER

BYK 606	Seminar	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

BYK 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

IV. SEMESTER

BYK 890	Thesis	0+1	30,0
			30,0

V. SEMESTER

BYK 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

BYK 602	Biochemistry of Metabolic Diseases	3+0	7,5
BYK 604	Biochemical Cascade Systems	3+0	7,5
BYK 605	Cell Culture Techniques	3+0	7,5
BYK 607	Protein Biochemistry	3+0	7,5
BYK 608	Apoptotic Pathways in Cancer	3+0	7,5
BYK 609	Nutritional Biochemistry	3+0	7,5
BYK 610	Comparative Biochemistry	3+0	7,5
BYK 611	Biochemistry of Immun System	3+0	7,5
BYK 612	Biochemical Omic Approaches	3+0	7,5
BYK 613	Biochemical Mechanisms	3+0	7,5
BYK 614	Recent Developments in Biochemistry	3+0	7,5
BYK 615	Separation by Capillary Electrophoresis Protein	3+0	7,5
BYK 616	Tumor Markers	3+0	7,5
BYK 618	Biochemistry of Aging	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UBK 901	Research in Area of Specialization	5+0	7,5
UBK 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

II. SEMESTER

BİY 536	Seminar	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

BİY 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

BİY 503	Laboratory Techniques in Biochemistry I	3+0	7,5
BİY 504	Laboratory Techniques in Biochemistry II	3+0	7,5
BİY 532	Introduction to Biochemistry I	3+0	7,5
BİY 533	Introduction to Biochemistry II	3+0	7,5

BİY 559	The Biology and Mechanisms of Apoptosis	3+0	7,5
BİY 566	Cellular Adhesion Molecules	3+0	2,5
BİY 568	Free Radicals and Antioxidants	3+0	5,0
BİY 569	Vitamin Biochemistry	3+0	5,0
BİY 576	Target Enzymes in the Treatment of Diseases	3+0	7,5
BİY 587	Biochemistry of Enzyme	3+0	7,5
BİY 588	Tissue Biochemistry	3+0	7,5
BİY 589	Cytokines, Cell Growth Control and Concerned Diseases	3+0	7,5
BİY 701	Biochemical Approaches to Drug Design	3+0	7,5
BİY 702	Enzymatic Biosynthesis	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UBİ 701	Research in Area of Specialization	3+0	4,5
UBİ 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHARMACEUTICAL BOTANY

The Department of Pharmaceutical Botany has contributed to the education for Master Science (M.Sc.) degree at Graduate Institute of Health Sciences since 1993. 2 associate professors, 2 assistant professors, 1 lecturer and 1 research assistants are currently working at the department.

Head : Prof. Dr. Yusuf ÖZTÜRK

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

FBT 603	Nomenclature and Using Terms	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FBT 602	Phylogenetic Systematic	3+0	7,5
FBT 618	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

FBT 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

IV. SEMESTER

FBT 890	Thesis	0+1	30,0
			30,0

V. SEMESTER

FBT 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

FBT 601	Basic Principles of Plant Systematics	3+0	7,5
FBT 604	Statistical Practices in Pharmaceutical Botany	3+0	7,5
FBT 605	Plants and Metabolites	3+0	7,5
FBT 606	Plant Geography	3+0	5,0
FBT 607	Palynology	3+0	7,5
FBT 608	Plant Richness of Turkey, Important Plant Areas and Nature Conservation	3+0	7,5
FBT 609	Plant Identification Techniques	3+0	7,5
FBT 610	Plants use in Drug Preparation	3+0	5,0
FBT 611	Medicinal Plant Cultivation	3+0	5,0
FBT 612	Collecting of Plants and Nature Photography	3+0	7,5
FBT 613	Plant Hormones	3+0	5,0
FBT 614	Structural Defense Mechanisms in Plants	3+0	5,0
FBT 615	Cytotaxonomy	3+0	7,5
FBT 616	Advanced Plant Anatomy	3+0	5,0
FKG 535	Microscopic and Macroscopic Identification of Powdered Vegetable Drugs	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFB 901	Research in Area of Specialization	5+0	7,5
UFB 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER			
FBT 502	Flowering Plant Anatomy	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER			
FBT 501	Plant Morphology	3+0	7,5
FBT 506	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER			
FBT 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER			

ELECTIVE COURSES

FBT 505	Techniques of Plant Preparation	3+0	7,5
FBT 510	Endemic Plants in Turkey	3+0	5,0
FBT 512	Molecular Methods in Plant Taxonomy	3+0	5,0
FBT 513	Plant Identification	3+0	7,5
FBT 515	Methods for Establishing an Herbarium	3+0	7,5
FBT 516	Harmful Plants	3+0	7,5
FBT 517	Introduction of Plant Ecology	3+0	5,0
FBT 519	Flora of Turkey: Introduction	3+0	5,0
FBT 521	Flora of Turkey I	3+0	5,0
FBT 522	Flora of Turkey II	3+0	5,0
FBT 523	Economic Plants	3+0	7,5
FBT 524	Flora of Turkey III	3+0	5,0
FBT 526	Flora of Turkey IV	3+0	5,0
FBT 537	Medicinal Plants of Anatolia	3+0	5,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFB 701	Research in Area of Specialization	3+0	4,5
UFB 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

The Department of Pharmaceutical Chemistry has contributed to the education for Master Science (M.Sc.) and Doctorate (Ph.D.) degrees at Graduate Institute of Health Sciences since 1993. 4 fultime professors, 2 associate professors, 4 assistant professors and 2 research assistants are currently working at the department. It is governed by a chairman and the decision related with the department is made by the department council which is composed of all members of the department.

Head : Prof. Dr. Ümit UÇUCU

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER			
FKM 621	Heterocyclic Drug Chemistry I	3+0	10,0
	Elective Courses (2)	-	20,0
			30,0

II. SEMESTER			
FKM 628	Seminar	3+0	10,0
	Elective Courses (2)	-	20,0
			30,0

III. SEMESTER			
	Elective Courses (3)	-	30,0
			30,0

IV. SEMESTER			
	Elective Courses (3)	-	30,0
			30,0

V. SEMESTER

FKM 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

VI. SEMESTER

FKM 890	Thesis	0+1	30,0
			30,0

VII. SEMESTER

FKM 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

FKM 615	The Methods of Stereospecific Synthesis	3+0	10,0
FKM 620	Peptide Syntheses	3+0	10,0
FKM 622	Heterocyclic Drug Chemistry II	3+0	10,0
FKM 623	The Mechanisms of Drug Synthesis I	3+0	10,0
FKM 624	The Mechanisms of Drug Synthesis II	3+0	10,0
FKM 625	Stereochemistry and Drug-Receptor Relations	3+0	10,0
FKM 626	Drug Enzyme Interactions	3+0	10,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFK 901	Research in Area of Specialization	5+0	7,5
UFK 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FKM 525	Functional Group Analyses in Drug Synthesis I	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FKM 505	Seminar	3+0	7,5
FKM 526	Functional Group Analyses in Drug Synthesis II	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

FKM 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

FKM 511	Inorganic Drug Chemistry	3+0	7,5
FKM 520	Raw Material Production in Pharmaceutical Industry	3+0	7,5
FKM 527	Structure-Activity Relationships in Pharmaceutical Chemistry I	3+0	7,5
FKM 528	Structure-Activity Relationships in Pharmaceutical Chemistry II	3+0	7,5
FKM 529	Basic Principles of Medicinal Chemistry	3+0	7,5
FKM 533	Chemical Separation and Purification Methods in Drug Synthesis	3+0	7,5
FKM 535	Chemical Quality Control Steps From Drug Raw Material Synthesis to Product	3+0	7,5
FKM 537	Pharmaceutical Nomenclature	3+0	4,5
FKM 539	Molecular Modelling in Drug Research	3+0	4,5
FKM 541	Innovative Drug Molecule Development Principles in Medicinal Chemistry	3+0	7,5
FKM 543	Working Safely in Laboratory	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFK 701	Research in Area of Specialization	3+0	4,5
UFK 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

The Department of Pharmaceutical Technology has contributed to the education for Master Science (M.Sc.) and Doctorate (Ph.D.) degrees at Graduate Institute of Health Sciences since 1993. 1 fultime professors, 5 assistant professors, 1 lecturer and 1 research assistants are currently working at the department. It is governed by a chairman and the decision related with the department is made by the department council which is composed of all members of the department.

Head : Prof. Dr. E. Yasemin YAZAN

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

FTE 623	Modern Drug Delivery Systems	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FTE 628	Seminar	3+0	7,5
FTE 632	Pharmaceutical Nanotechnology and Drug Targeting	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

IV. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

V. SEMESTER

FTE 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

VI. SEMESTER

FTE 890	Thesis	0+1	30,0
			30,0

VII. SEMESTER

FTE 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

FTE 620	Parenteral Preparation Technology	3+0	7,5
FTE 621	Bioavailability and Bioequivalance	3+0	7,5
FTE 622	Biopharmaceutic and Pharmacokinetics	3+0	7,5
FTE 624	Multiple Phase Systems	3+0	7,5
FTE 625	Controlled Release Systems	3+0	7,5
FTE 626	Powder Drugs and Micromeritics	3+0	7,5
FTE 627	Pharmaceutical Process Validation	3+0	7,5
FTE 629	Dissolution Rate in Drug Delivery Systems	3+0	7,5
FTE 630	Ocular Drug Delivery Systems	3+0	7,5
FTE 631	Solid Drug Delivery Systems	3+0	5,0
FTE 634	Transdermal and Transmucosal Drug Delivery Systems	3+0	7,5
FTE 638	Semi-Solid Drug Delivery System	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFT 901	Research in Area of Specialization	5+0	7,5
UFT 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FTE 539	Polymers Used in Drug Delivery Systems	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FTE 505	Seminar	3+0	7,5
FTE 538	Analyses of Drug Delivery Systems	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

FTE 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

FTE 521	Good Drug Manufacturing Technique (GMP, GLP, ISO)	4+0	7,5
FTE 522	Methods of Targeting in Pharmaceutical Biotechnology	3+0	7,5
FTE 523	Immunotherapeutic Products and Their Technology	3+0	7,5
FTE 526	Biosimilar Products and Their Registration	3+0	7,5
FTE 527	Physical Pharmacy	3+0	7,5
FTE 529	Pharmaceutical Biotechnology Products and Their Use	3+0	7,5
FTE 533	Pharmaceutical Dosage Forms and Quality Controls	3+0	7,5
FTE 535	Validation Analysis Methods, Quality Control Systems and Statistical Methods	3+0	7,5
FTE 536	Reaction Kinetics and Physical-Chemical Stability	3+0	7,5
FTE 537	Patent Rights for Drugs, Drug Lisencing, Harmonization and Industrial	3+0	7,5
FTE 541	Statistics in Pharmaceutical Technology Research	3+0	7,5
FTE 543	Pharmaceutical Unit Operations	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFT 701	Research in Area of Specialization	3+0	4,5
UFT 702	Research in Area of Specialization	3+0	4,5

PROGRAM IN COSMETOLOGY

Postgraduate education at the Department of Cosmetology first began at the autumn semester of 1994-1995. It has contributed to the education for Master Science (M.Sc.) at Graduate Institute of Health Sciences. 1 fultime professors, 5 assistant professors, 1 lecturer and 1 research assistants are currently working at the department.

PROGRAM

I. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

II. SEMESTER

KOZ 505	Seminar	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

KOZ 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

KOZ 509	Ethical and Legal Applications in Cosmetic Production	3+0	5,0
KOZ 510	In Vivo Tests Applied to Cosmetics	3+0	5,0
KOZ 511	Cosmetic Delivery Systems	3+0	7,5

KOZ 512	Quality Control and Assurance of Cosmetic Preparations	3+0	7,5
KOZ 513	Cosmetic Raw Materials and Their Functions	3+0	7,5
KOZ 514	Cosmetic Preparation-Application Relation	3+0	5,0
KOZ 515	Formulation Processes of Cosmetic Preparation	3+0	7,5
KOZ 517	Characterization of Cosmetic Preparations	3+0	7,5
KOZ 518	Licensing of Cosmetic Products	2+0	6,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFT 701	Research in Area of Specialization	3+0	4,5
UFT 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHARMACEUTICAL TOXICOLOGY

The Department of Pharmaceutical Toxicology has contributed to the education for Master Science (M.Sc.) degree at Graduate Institute of Health Sciences since 1993. 1 assistant professors and 3 research assistants are currently working at the department.

Head : Assoc. Prof. Dr. Bülent ERGUN

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FTK 509	Analytical Toxicology Methods	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FTK 504	Environmental Toxicology and Pesticides	3+0	7,5
FTK 505	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

FTK 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

FTK 503	Industrial Toxicology	3+0	7,5
FTK 507	Food Toxicology	3+0	7,5
FTK 508	Drug Dependence, Doping Substances Used in Sports	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFS 701	Research in Area of Specialization	3+0	4,5
UFS 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHARMACOGNOSY

The Pharmacognosy Department serves for MSc and PhD programs of the institute since 1993. The department consists from 2 fulltime professors, 4 associate professors, 5 assistant professors, 1 assistant and 1 lecturer. Natural products and drugs from various biological resources are investigated in a wide spectrum.

Head : Prof. Dr. Neşe KIRIMER

(NON-THESIS) MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FKG 501	Extraction of Natural Products	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FKG 502	Chromatographic Techniques Used in Seperation of Natural Compounds	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

FKG 521	Term Project	3+0	15,0
	Elective Courses (2)	-	15,0
			30,0

ELECTIVE COURSES

FKG 504	Distillation Techniques used for Natural Materials	3+0	7,5
FKG 509	Alkoloid Chemistry	3+0	7,5
FKG 515	Spectroscopic Methods used in Structure Elucidation of Natural Compounds	3+0	7,5
FKG 516	Herbal Teas	3+0	7,5
FKG 523	Discovery of Natural Active Ingredients	3+0	7,5
FKG 524	Dietary Supplements and Functional Food of Plant Origin	3+0	7,5
FKG 525	Hallucinogenic and Narcotic Plants	3+0	7,5
FKG 526	Screening Techiques for Biological Activities of Medicinal Plants	3+0	7,5
FKG 528	Vitamins and Minerals of Plant and Animal Origin	3+0	7,5
FKG 529	Biotrasformations in Pharmacognosy	3+0	7,5
FKG 530	Phytopharmaceuticals	3+0	7,5
FKG 531	Complementary Medicinal Products from Natural Sources	3+0	7,5
FKG 533	Practical Techniques in Pharmacognosy	2+1	7,5
FKG 534	Principles of Homeopathy and Drugs used in Homeopathy	3+0	7,5
FKG 535	Microscopic and Macroscopic Identification of Powdered Vegetable Drugs	3+0	7,5
FKG 536	The High Performance Liquid Chromatography (HPLC) Applications of Herbal Drugs	3+0	7,5
FKG 537	Herbal Products in Pharmacapoeias	3+0	7,5
FKG 538	Industrial Pharmacognosy	3+0	7,5
FKG 540	Plant-Source Toxic Compounds	3+0	7,5
FKG 542	Aromatherapy	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5

PROGRAM IN PHYTOTHERAPY (EVENING)

PROGRAM

I. SEMESTER

FTT 501	Principles of Phytotherapy	3+0	7,5
FTT 503	Drugs Used in Phytotherapy I	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

II. SEMESTER

FTT 504	Drugs Used in Phytotherapy II	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

FTT 521	Term Project	3+0	15,0
	Elective Courses (2)	-	15,0
			30,0

ELECTIVE COURSES

FKG 501	Extraction of Natural Products	3+0	7,5
FKG 502	Chromatographic Techniques Used in Seperation of Natural Compounds	3+0	7,5
FKG 504	Distillation Techniques used for Natural Materials	3+0	7,5
FKG 516	Herbal Teas	3+0	7,5
FKG 524	Dietary Supplements and Functional Food of Plant Origin	3+0	7,5
FKG 525	Hallucinogenic and Narcotic Plants	3+0	7,5
FKG 528	Vitamins and Minerals of Plant and Animal Origin	3+0	7,5
FKG 531	Complementary Medicinal Products from Natural Sources	3+0	7,5
FKG 537	Herbal Products in Pharmacapoeias	3+0	7,5
FTT 502	Herbal Preparation-Drug-Food Interactions in Phytotherapy	3+0	7,5
FTT 505	Standardization of Drugs used in Phytotherapy	3+0	7,5
FTT 506	Introduction to Phytochemistry	3+0	7,5
FTT 508	Secondary Metabolites I	3+0	7,5
FTT 510	Secondary Metabolites II	3+0	7,5
FTT 512	Microscopic Characteristics of Herbal Teas	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

FKG 601	Advanced Pharmacognosy I	3+0	10,0
	Elective Courses (2)	-	20,0
			30,0

II. SEMESTER

FKG 626	Seminar	3+0	10,0
	Elective Courses (2)	-	20,0
			30,0

III. SEMESTER

	Elective Courses (3)	-	30,0
			30,0

IV. SEMESTER

	Elective Courses (3)	-	30,0
			30,0

V. SEMESTER

FKG 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

VI. SEMESTER

FKG 890	Thesis	0+1	30,0
			30,0

VII. SEMESTER

FKG 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

FKG 602	Advanced Pharmacognosy II	3+0	10,0
FKG 603	Plant Biosynthesis I	3+0	10,0
FKG 609	Chemotaxonomy	3+0	10,0
FKG 610	Preperative Seperation Techniques for Natural Products	3+0	10,0
FKG 611	Analysis and Research Techniques in Phytochemistry	3+0	10,0
FKG 612	Antioxidant Activity of Plant Phenolics	3+0	10,0
FKG 613	Etnopharmagnosy	3+0	10,0
FKG 614	Plant Biosynthesis II	3+0	10,0
FKG 615	Mass Spectrometry in Structure Elucidation of Natural Compounds	2+2	10,0
FKG 617	Flavonoids and Biological Activities	3+0	10,0
FKG 618	Aroma Compounds and Their Analysis	2+2	10,0
FKG 619	Terpenes: Chemistry and Biological Activities	2+2	10,0
FKG 620	NMR Spectroscopy in Structure Elucidation of Natural Compounds	2+2	10,0
FKG 621	Animal-Source Drugs and Bioactive Compounds	3+0	10,0
FKG 622	Natural Plant and Animal Materials Used in Cosmetics	3+0	10,0
FKG 624	Marine Products Pharmacognosy	3+0	10,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFG 901	Research in Area of Specialization	5+0	7,5
UFG 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FKG 501	Extraction of Natural Products	3+0	7,5
FKG 503	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

II. SEMESTER

FKG 502	Chromatographic Techniques Used in Seperation of Natural Compounds	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

FKG 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

FKG 504	Distillation Techniques used for Natural Materials	3+0	7,5
FKG 509	Alkoloid Chemistry	3+0	7,5
FKG 515	Spectroscopic Methods used in Structure Elucidation of Natural Compounds	3+0	7,5
FKG 516	Herbal Teas	3+0	7,5
FKG 523	Discovery of Natural Active Ingredients	3+0	7,5
FKG 524	Dietary Supplements and Functional Food of Plant Origin	3+0	7,5
FKG 525	Hallucinogenic and Narcotic Plants	3+0	7,5
FKG 526	Screening Techiques for Biological Activities of Medicinal Plants	3+0	7,5
FKG 528	Vitamins and Minerals of Plant and Animal Origin	3+0	7,5
FKG 529	Biotrasformations in Pharmacognosy	3+0	7,5
FKG 530	Phytopharmaceuticals	3+0	7,5
FKG 531	Complementary Medicinal Products from Natural Sources	3+0	7,5
FKG 533	Practical Techniques in Pharmacognosy	2+1	7,5
FKG 534	Principles of Homeopathy and Drugs used in Homeopathy	3+0	7,5
FKG 535	Microscopic and Macroscopic Identification of Powdered Vegetable Drugs	3+0	7,5
FKG 536	The High Performance Liquid Chromatography (HPLC) Applications of Herbal Drugs	3+0	7,5
FKG 537	Herbal Products in Pharmacapoeias	3+0	7,5
FKG 538	Industrial Pharmacognosy	3+0	7,5
FKG 540	Plant-Source Toxic Compounds	3+0	7,5
FKG 542	Aromatherapy	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFG 701	Research in Area of Specialization	3+0	4,5
UFG 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHARMACOLOGY

The lessons opened by the Department of Pharmacology are on the effects and mechanism of actions of drugs on living things. The main area of investigations of the department is pharmacological effects, toxicities and mechanism of actions of drugs and drug candidates including synthetic and natural origin. Actions of endogenous agents, mechanisms involved in diseases and also experimental disease models including diabetes and hepatitis are among the investigational topics of the department.

Head : Prof. Dr. Yusuf ÖZTÜRK

(NON-THESIS) MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FKL 523	Experimental Pharmacology I	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

III. SEMESTER

FKL 519	Term Project	3+0	15,0
	Elective Courses (2)	-	15,0
			30,0

ELECTIVE COURSES

FKL 502	Neurohumoral Interactions	3+0	7,5
FKL 504	Endocrine Pharmacology	3+0	7,5
FKL 505	Peptidergic Mechanisms	3+0	7,5
FKL 506	Drug Originated Diseases	3+0	7,5
FKL 512	Receptors, Signal Transuduction and Drug Action	3+0	7,5
FKL 516	Application of Molecular Biological Methods in Pharmacology	1+2	7,5
FKL 518	Active Transport Mechanisms and Regulatory Proteins	3+0	7,5
FKL 520	Behavioral Pharmacology	3+0	7,5
FKL 524	Physiology of Circulation System	3+0	7,5
FKL 525	Ion Channels Pharmacology	3+0	7,5
FKL 527	Cancer Pharmacology	3+0	7,5
FKL 529	Pharmacogenetic	3+0	7,5
FKL 531	Receptor Theories and Experimental Application	3+0	7,5
FKL 539	Physiology of Nerve and Muscle Cells	3+0	7,5
FKL 541	Neurodegenerative Diseases	3+0	7,5
FKL 543	Perinatal and Pediatric Pharmacology	3+0	7,5
FKL 545	Geriatric Pharmacology	3+0	7,5
FKL 547	Pharmacotherapy	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

FKL 602	Molecular Pharmacology	3+0	10,0
	Elective Courses (2)	-	20,0
			30,0

II. SEMESTER

FKL 630	Seminar	3+0	10,0
	Elective Courses (2)	-	20,0
			30,0

III. SEMESTER

	Elective Courses (3)	-	30,0
			30,0

IV. SEMESTER

	Elective Courses (3)	-	30,0
			30,0

V. SEMESTER

FKL 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

VI. SEMESTER

FKL 890	Thesis	0+1	30,0
			30,0

VII. SEMESTER

FKL 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

FKL 607	Introduction to Nervous System	3+0	10,0
FKL 608	Cardiovascular Pharmacology	3+0	10,0
FKL 609	Biochemical Pharmacology	3+0	10,0
FKL 610	Drug interactions	3+0	10,0
FKL 612	Central Nervous System Drugs	3+0	10,0
FKL 617	Autocoids	3+0	10,0
FKL 620	Immunopharmacology	3+0	10,0
FKL 621	Experimental Pharmacology II	3+0	10,0
FKL 622	Ethnopharmacology	3+0	10,0
FKL 623	Pharmacology of Autonomic Nervous System	3+0	10,0
FKL 624	Digital Applications in Pharmacology	3+0	10,0
FKL 625	Gene Transfere Methods	3+0	10,0
FKL 626	Pharmacovigilance and Human Pharmacology	3+0	10,0
FKL 627	Cardivascular Pharmacology	3+0	10,0
FKL 628	Blood Physiology	3+0	10,0
FKL 629	Cell Pysiology	3+0	10,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFL 901	Research in Area of Specialization	5+0	7,5
UFL 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FKL 523	Experimental Pharmacology I	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FKL 503	Seminar	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

III. SEMESTER

FKL 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

FKL 502	Neurohumoral Interactions	3+0	7,5
FKL 504	Endocrine Pharmacology	3+0	7,5
FKL 505	Peptidergic Mechanisms	3+0	7,5
FKL 506	Drug Originated Diseases	3+0	7,5
FKL 512	Receptors, Signal Transuduction and Drug Action	3+0	7,5
FKL 516	Application of Molecular Biological Methods in Pharmacology	1+2	7,5
FKL 518	Active Transport Mechanisms and Regulatory Proteins	3+0	7,5
FKL 520	Behavioral Pharmacology	3+0	7,5
FKL 522	Economy of Drugs	3+0	7,5
FKL 524	Physiology of Circulation System	3+0	7,5
FKL 525	Ion Channels Pharmacology	3+0	7,5
FKL 527	Cancer Pharmacology	3+0	7,5
FKL 529	Pharmacogenetic	3+0	7,5
FKL 531	Receptor Theories and Experimental Application	3+0	7,5
FKL 533	Pharmacological Basis of Licensing	3+0	7,5
FKL 539	Physiology of Nerve and Muscle Cells	3+0	7,5
FKL 541	Neurodegenerative Diseases	3+0	7,5
FKL 543	Perinatal and Pediatric Pharmacology	3+0	7,5
FKL 545	Geriatric Pharmacology	3+0	7,5
FKL 547	Pharmacotherapy	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFL 701	Research in Area of Specialization	3+0	4,5
UFL 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF PHYSICAL EDUCATION AND SPORTS

This program is aimed to design productive systems and to educate qualified persons in the field of physical training and sports, to introduce developing facilities of sportive technology and to spread physical training and sports at the scale of country. Hence, the students participating programs applied are aimed to be the persons which know the structure, function and behavior of human body, and Turkish organizations of sports with the ability of comparative evaluations as well as possessing the characteristics of teacher and trainer.

Head : Prof. Dr. İlker YILMAZ

(NON-THESIS) MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

	Elective Courses (5)	-	30,0
			30,0

II. SEMESTER

	Elective Courses (4)	-	30,0
			30,0

III. SEMESTER

BES 521	Term Project	3+0	15,0
	Elective Courses (2)	-	15,0
			30,0

ELECTIVE COURSES

BES 501	The Organization and Leadership in Sport	3+0	7,5
BES 504	Sport Medicine	3+0	7,5
BES 505	Protection Sport Accidents and Treatment Approaches	3+0	5,0
BES 508	Exercise Physiology	3+0	5,0
BES 509	Sports for Disability Persons	3+0	5,0
BES 510	Operation of Sport Foundations	3+0	5,0
BES 511	Sport Marketing	3+0	5,0
BES 512	Sports Economy	3+0	7,5
BES 513	Sport Management	3+0	7,5
BES 514	Relationship Between Sport and Media	3+0	5,0
BES 515	Public Relations in Sport	3+0	7,5
BES 516	Motivation in Sport	3+0	5,0
BES 517	Sport Physiology	3+0	5,0
BES 518	Physical Appropriateness	3+0	5,0
BES 520	Experimental Applications in Sportive Performance	3+0	5,0
BES 522	Experimental Approach to Exercise Neurophysiology	3+0	5,0
BES 523	Introduction to Exercise Neurophysiology	3+0	5,0
BES 524	Advanced Training Theory	3+0	5,0
BES 525	Talent and Talent Identification for Sports in Children	3+0	5,0
BES 527	Basic Training Theory	3+0	5,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

BES 629	Research Methods and Techniques in Sports	3+0	6,0
	Elective Courses (4)	-	24,0
			30,0

II. SEMESTER

BES 604	Seminar	3+0	6,0
İST 632	Statistics II	3+0	6,0
	Elective Courses (3)	-	18,0
			30,0

III. SEMESTER

	Elective Courses (5)	-	30,0
			30,0

IV. SEMESTER

	Elective Courses (5)	-	30,0
			30,0

V. SEMESTER

BES 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

VI. SEMESTER

BES 890	Thesis	0+1	30,0
			30,0

VII. SEMESTER

BES 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

BES 601	Teaching Methodology in Physical Education and Sports	3+0	6,0
BES 602	Statistical Decision Making Techniques	3+0	6,0
BES 603	Advanced Exercise Physiology	3+0	6,0
BES 605	Skill Learning in Sports	3+0	6,0
BES 606	Curriculum Development in Physical Education and Sports	3+0	6,0
BES 607	Sports for the Disabled	3+0	6,0
BES 608	Advanced Biomechanics	3+0	6,0
BES 611	Advanced Anatomy in Sports	3+0	6,0
BES 612	Neuromuscular Adaptation and Fatigue	3+0	6,0
BES 613	Biochemistry of Exercise	3+0	6,0
BES 614	Substance Use in Sports	3+0	6,0
BES 616	Medical Subjects in Sports and Health Organizations for Athletes	3+0	6,0
BES 617	Adaptation to Strength Training	3+0	6,0
BES 618	Approaches in Sports Psychology	3+0	6,0
BES 619	Training Theory I	3+0	6,0
BES 620	Training Theory II	3+0	6,0
BES 621	Sports Sociology I	3+0	6,0
BES 622	Sport Sociology II	3+0	6,0
BES 623	Experimental Approaches in Physical Education and Sports I	3+0	6,0
BES 624	Experimental Approaches in Physical Education and Sports II	3+0	6,0
BES 625	Qualitative and Quantitative Research Approaches	3+0	6,0
BES 626	Contemporary Approaches in Sport and Exercise Psychology	3+0	6,0
BES 627	Social Psychology of Sport	3+0	6,0
BES 628	Arousal Theories in Sport	3+0	6,0
BES 630	Exercise Approaches for Special Groups	3+0	6,0
BES 631	Instructional Models for Physical Education	3+0	6,0
BES 632	In Biological Systems Methods of Analysis of Reactive Oxygen Species	3+0	6,0
BES 633	Exercise Prescription	3+0	6,0
BES 635	Anti-Aging and Exercise	3+0	6,0
BES 637	Exercise and Oxidative Stress	3+0	6,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UBE 901	Research in Area of Specialization	5+0	7,5
UBE 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

BES 533	Introduction to Research Methods and Technics in Sports	3+0	7,5
İST 543	Statistics I	3+0	7,5
	Elective Courses (3)	-	15,0
			30,0

II. SEMESTER

BES 506	Seminar	3+0	7,5
	Elective Courses (4)	-	22,5
			30,0

III. SEMESTER

BES 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

ANA 501	Functional Anatomy	3+0	5,0
ANA 503	Physiology I	3+0	5,0
ANA 504	Physiology II	3+0	5,0
BES 504	Sport Medicine	3+0	7,5
BES 505	Protection Sport Accidents and Treatment Approaches	3+0	5,0
BES 508	Exercise Physiology	3+0	5,0
BES 509	Sports for Disability Persons	3+0	5,0
BES 516	Motivation in Sport	3+0	5,0
BES 517	Sport Physiology	3+0	5,0
BES 518	Physical Appropriateness	3+0	5,0
BES 520	Experimental Applications in Sportive Performance	3+0	5,0
BES 522	Experimental Approach to Exercise Neurophysiology	3+0	5,0

BES 523	Introduction to Exercise Neurophysiology	3+0	5,0
BES 524	Advanced Training Theory	3+0	5,0
BES 525	Talent and Talent Identification for Sports in Children	3+0	5,0
BES 526	Motivational Orientations in Sport	3+0	5,0
BES 527	Basic Training Theory	3+0	5,0
BES 528	Planning and Evaluation in Physical Education Teaching	3+0	5,0
BES 530	Antioxidants and Athletics Performance	3+0	5,0
BES 531	Exercise and Sport Psychology	3+0	5,0
BES 535	Movement Science and Performance Training	3+0	5,0
BES 537	Analysis of Sportive Technique	3+0	5,0
BES 539	Motor Control of Human Movement	3+0	5,0
EDB 501	Academic Writing Skills	3+0	5,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UBE 701	Research in Area of Specialization	3+0	4,5
UBE 702	Research in Area of Specialization	3+0	4,5

DEPARTMENT OF SPEECH AND LANGUAGE THERAPY

There are a vast number of people who have speech and language disorders in Turkey. Why the related service cannot be supplied efficiently has been attributed to the lack of trained personnel in the field. Especially due to the mentioned necessity, our program initiated a graduate program of speech & language therapy, under the management of The Instute of Health Sciences at Anadolu University.

Head : Prof. Dr. Şükrü TORUN

(NON-THESIS) MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

DKT 505	Research Methods in Speech and Language Therapy	3+0	5,0
DKT 543	Applied Clinical Studies and Seminar I	0+5	2,0
DKT 549	Articulatory and Phonological Disorders	3+0	5,0
	Elective Courses (5)	-	18,0
			30,0

II. SEMESTER

DKT 544	Applied Clinical Studies and Seminar II	0+5	2,0
DKT 574	Clinical Educational Evaluation and Research on Effectiveness of the Therapy	2+0	5,0
DKT 590	Swallowing Disorders	2+1	5,0
	Elective Courses (4)	-	18,0
			30,0

III. SEMESTER

DKT 541	Term Project	3+0	15,0
	Elective Courses (4)	-	15,0
			30,0

SCIENTIFIC PREPARATION 1

DKT 547	Introduction to Speech and Language Disorders	3+0	4,0
DKT 580	Applied Behavior Analysis: Observation II	0+5	2,0
	Elective Courses (6)	-	24,0
			30,0

SCIENTIFIC PREPARATION 2

DKT 542	Clinical Phonology	3+0	4,0
DKT 563	Developing Therapy Plan and Psychometrics: Observation 1	0+5	2,0
	Elective Courses (6)	-	24,0
			30,0

ELECTIVE COURSES

DKT 530	Speech Therapy for the Hearing Impaired	2+1	5,0
DKT 532	Alternative Communication Methods and Technologies	2+0	4,0
DKT 533	Family Therapy and Consultation in Speech and Language Disorders	2+0	3,0
DKT 534	Functional Communication Training	2+0	4,0
DKT 538	Childhood Language Disorders: Therapy Approaches	3+0	4,0
DKT 545	Applied Clinical Studies and Seminar III	0+5	2,0
DKT 546	Applied Clinical Studies and Seminar IV	0+5	2,0
DKT 548	Phonetics and Acoustics of Hearing and Speech	3+0	4,0
DKT 550	Anatomical, Physiological and Neurological Basics of Speech and Language	3+0	4,0
DKT 551	Developmental Language Disorders	3+0	4,0
DKT 553	Verbal Fluency Disorders	3+0	5,0
DKT 554	An Overview of Audiology	3+0	4,0
DKT 555	Acquired Language Disorders	3+0	5,0
DKT 556	Psycholinguistics: Language Development and Delayed Speech	3+0	4,0
DKT 557	Motor Speech Disorders	3+0	4,0
DKT 558	Clinical Neurolinguistics	3+0	4,0
DKT 559	Speech Pathology and Linguistics	3+0	4,0
DKT 561	Ear, Nose and Throat Disorders and Jaw and Face Anomalies	2+0	3,0
DKT 562	Child and Adult Audiology	3+0	4,0
DKT 565	Music and Sound for Speech and Language Pathologist	2+0	2,0
DKT 566	Speech Science	3+0	3,0
DKT 567	Eloquence and Diction in Speech and Language Therapy	2+0	2,0
DKT 568	Development of Verbal Language in the Hearing Impaired	3+0	4,0
DKT 569	Intervention to Cleft Lip and Palate: Surgical, Orthodontic and Therapeutic Techniques	3+0	4,0
DKT 572	Single Subject Research Design and Case Studies in Speech and Language Disorders	3+0	4,0
DKT 573	Communication, Language and Speech Therapy in Autism	3+0	4,0
DKT 578	Linguistic Analysis	2+0	3,0
DKT 582	Community (Public) Health, First Aid and Basic Pharmacology	2+0	3,0
DKT 584	Basic Visualization and Analysis Methods	2+2	5,0
DKT 586	Basic Geriatrics	3+0	4,0
DKT 588	Pervasive Developmental Disorders with Neurological Basis	3+0	4,0
DKT 592	Voice Disorders	3+0	5,0
DKT 594	Assessment and Therapy in Pediatric Feeding-Swallowing Disorders	2+2	5,0
DKT 596	Assessment and Therapy in Pediatric Voice Disorders	2+2	5,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5

DOCTORATE DEGREE (PH.D)

PROGRAM

I. SEMESTER

DKT 635	Language and Speech Therapy Clinical Practicum I	2+2	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

DKT 636	Language and Speech Therapy Clinical Practicum II	2+2	7,5
DKT 654	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

DKT 637	Language and Speech Therapy Clinical Practicum III	2+2	7,5
	Elective Courses (3)	-	22,5
			30,0

IV. SEMESTER

DKT 638	Language and Speech Therapy Clinical Practicum IV	2+2	7,5
	Elective Courses (3)	-	22,5
			30,0

V. SEMESTER

DKT 890-0	Thesis (Thesis Proposal)	0+1	30,0
			30,0

VI. SEMESTER

DKT 890	Thesis	0+1	30,0
			30,0

VII. SEMESTER

DKT 890	Thesis	0+1	30,0
			30,0

ELECTIVE COURSES

DKT 601	Research Methods in Speech and Language Therapy	3+0	7,5
DKT 602	Analysis of Research in Speech and Language Therapy	3+0	7,5
DKT 608	Therapy Approaches to/for Neuro-Motor Speech Disorders	3+0	7,5
DKT 611	Geriatric Communication Disorders	3+0	7,5
DKT 615	Speech Therapy for Children and Adults with Hearing Impairment and Cochlear Implants	3+0	7,5
DKT 617	Genetics Research in Speech and Language Disorders	3+0	7,5
DKT 618	Language-Brain Research	3+0	7,5
DKT 619	Research in Linguistics	3+0	7,5
DKT 620	Speech Fluency Research and Theories	3+0	7,5
DKT 621	Current Practice Regarding Language Disorders in the Infants and Toddlers	3+0	7,5
DKT 623	Speech Therapy and Rehabilitation in the Laryngectomees	3+0	7,5
DKT 624	Technological Research in Speech Science	3+0	7,5
DKT 625	Eperimental Phonetics: Advanced Studies	3+0	7,5
DKT 627	Central Auditory Processing Disorders	3+0	7,5
DKT 628	Special Topics and Contemporary Professional Issues in Speech and Language Therapy	3+0	7,5
DKT 630	Phoniatrics	3+0	7,5
DKT 640	Aphasia and Contemporary Therapy	3+0	7,5
DKT 642	Evidence-Based Practice in Speech and Language Pathology	3+0	7,5
DKT 644	Specific Language Impairment (SLI)	3+0	7,5
DKT 648	Clinical Research in Pediatric Swallowing and Voice Disorders	3+3	7,5
DKT 650	Clinical Research in Swallowing Disorders	3+3	7,5
DKT 651	Evidence-Based Practices in Cleft Lip-Palate-Craniofacial Anomalies	3+0	7,5
DKT 652	Clinical Research in Voice Disorders	3+3	7,5
DKT 653	Current Approaches in Traumatic Brain Injury and the Right Brain Damage	3+0	7,5
DKT 655	Single Subject Designs in Speech and Language Therapy	3+0	7,5
DKT 656	Current Perspectives on Fluency Disorders	3+0	7,5
DKT 658	Scale Development and Adaptation in Speech and Language Therapy	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UDK 901	Research in Area of Specialization	5+0	7,5
UDK 902	Research in Area of Specialization	5+0	7,5

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

DKT 577	Applied Clinical Studies I	0+5	2,0
	Elective Courses (7)	-	28,0
			30,0

II. SEMESTER

DKT 505	Research Methods in Speech and Language Therapy	3+0	5,0
DKT 579	Applied Clinical Studies II	0+5	2,0
DKT 585	Clinical-Educational Evaluation and Research on Effectiveness of the Therapy	3+0	5,0
DKT 712	Seminar	3+0	5,0
	Elective Courses (3)	-	13,0
			30,0

III. SEMESTER

DKT 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

SCIENTIFIC PREPARATION 1

DKT 547	Introduction to Speech and Language Disorders	3+0	4,0
DKT 580	Applied Behavior Analysis: Observation II	0+5	2,0
	Elective Courses (6)	-	24,0
			30,0

SCIENTIFIC PREPARATION 2

DKT 542	Clinical Phonology	3+0	4,0
DKT 563	Developing Therapy Plan and Psychometrics: Observation 1	0+5	2,0
	Elective Courses (6)	-	24,0
			30,0

ELECTIVE COURSES

DKT 530	Speech Therapy for the Hearing Impaired	2+1	5,0
DKT 532	Alternative Communication Methods and Technologies	2+0	4,0
DKT 534	Functional Communication Training	2+0	4,0
DKT 548	Phonetics and Acoustics of Hearing and Speech	3+0	4,0
DKT 549	Articulatory and Phonological Disorders	3+0	5,0
DKT 550	Anatomical, Physiological and Neurological Basics of Speech and Language	3+0	4,0
DKT 554	An Overview of Audiology	3+0	4,0
DKT 556	Psycholinguistics: Language Development and Delayed Speech	3+0	4,0
DKT 558	Clinical Neurolinguistics	3+0	4,0
DKT 559	Speech Pathology and Linguistics	3+0	4,0
DKT 561	Ear, Nose and Throat Disorders and Jaw and Face Anomalies	2+0	3,0
DKT 562	Child and Adult Audiology	3+0	4,0
DKT 565	Music and Sound for Speech and Language Pathologist	2+0	2,0
DKT 566	Speech Science	3+0	3,0
DKT 567	Eloquence and Diction in Speech and Language Therapy	2+0	2,0
DKT 572	Single Subject Research Design and Case Studies in Speech and Language Disorders	3+0	4,0
DKT 573	Communication, Language and Speech Therapy in Autism	3+0	4,0
DKT 578	Linguistic Analysis	2+0	3,0
DKT 581	Applied Clinical Studies III	0+5	2,0
DKT 582	Community (Public) Health, First Aid and Basic Pharmacology	2+0	3,0
DKT 583	Applied Clinical Studies IV	0+5	2,0
DKT 587	Further Evaluation and Therapy for Childhood Language Disorders	3+0	4,0
DKT 588	Pervasive Developmental Disorders with Neurological Basis	3+0	4,0
DKT 589	Differential Assessment in Early Childhood	3+0	4,0
DKT 590	Swallowing Disorders	2+1	5,0
DKT 591	Research on Fluency Disorders	3+0	5,0
DKT 593	Neurogenic Communication Disorders:TBI and Right-Brain Damage	3+0	5,0
DKT 595	Motor Speech Disorders Research	3+0	4,0
DKT 596	Assessment and Therapy in Pediatric Voice Disorders	2+2	5,0
DKT 597	Language Studies in Hearing Impaired	3+0	4,0
DKT 598	Assessment and Intervention of Craniofacial Abnormalities	3+0	4,0
DKT 599	Rehabilitation of Voice Disorders	3+0	5,0
DKT 701	Speech and Language Therapy in Autism Spectrum Disorder	3+0	3,0
DKT 702	Imaging and Analysis of ENT Diseases	2+2	5,0
DKT 704	Speech and Language Disorders in Neurodegenerative Diseases	4+0	4,0
DKT 706	Evidence-Based Practice in Aphasia	3+0	4,0
DKT 708	Speech and Language Therapy in Specific Learning Disability (Dyslexia, Dysgraphia)	3+0	3,0
DKT 710	Scale Development	3+0	3,0
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UDK 701	Research in Area of Specialization	3+0	4,5
UDK 702	Research in Area of Specialization	3+0	4,5

PHARMACEUTICAL MICROBIOLOGY

The Department of Pharmaceutical Microbiology was actived at the Faculty of Pharmacy in 2003. Postgraduate education at the Department of Pharmaceutical Microbiology first began at the spring semester of 2007-2008 and it has contributed to the education for Master Science (M.Sc.) at Graduate Institute of Health Sciences. 1fulltime associate professor and 1 research assistant and 1 Ms.D are currently working at the department.

Head : Prof. Dr. Yağmur TUNALI

MASTER OF SCIENCE (MS) DEGREE

PROGRAM

I. SEMESTER

FTM 501	Advanced Pharmaceutical Microbiology	3+0	7,5
	Elective Courses (3)	-	22,5
			30,0

II. SEMESTER

FTM 502	Methods for Determining Antimicrobial Activity	3+0	7,5
FTM 504	Seminar	3+0	7,5
	Elective Courses (2)	-	15,0
			30,0

III. SEMESTER

FTM 790	Thesis	0+1	30,0
			30,0

IV. SEMESTER

ELECTIVE COURSES

FTM 503	Advanced Pharmaceutical Microbiological Applications	3+0	7,5
FTM 505	Methods of Sterilization and Disinfection	3+0	7,5
FTM 506	Microbial Toxins	3+0	7,5
FTM 507	Methods of Measuring Microbial Population	3+0	7,5
FTM 508	Microbiolagical Control Techniques of Sterile Pharmaceutical Products	3+0	7,5
FTM 509	Isolation and Typing Methods of Bacteria	3+0	7,5
FTM 510	Chemotherapeutics and Their Mechanisms of Action	3+0	7,5
FTM 511	Enzyme Technology	3+0	5,0
FTM 512	Molecular Genetics of Bacteria	3+0	5,0
FTM 513	Allergy	3+0	7,5
FTM 514	Antineoplastic, Immünosupressan and Antimicrobial Drugs and Their Mechanisms of Action	3+0	5,0
FTM 515	Serology and Serological Techniques	3+0	7,5
FTM 516	Antimicrobial and Immunostimulan Plants	3+0	5,0
FTM 517	Virology	3+0	7,5
FTM 518	Cosmetic Microbiology	3+0	7,5
FTM 519	Molecular Microbiological Techniques	3+0	7,5
FTM 520	Micology	3+0	7,5
FTM 522	Industrial Microbiology	3+0	7,5
FTM 524	Microbial Metabolism	3+0	7,5
SBE 510	Ethics of Science and Research Techniques	2+0	7,5
UFM 701	Research in Area of Specialization	3+0	4,5
UFM 702	Research in Area of Specialization	3+0	4,5

COURSE CONTENTS

ANA 501 Functional Anatomy 3+0 5,0
Basic Terminology of Kinesiology and Anatomy; Terms Related to Movement; Basic Anatomic Positions; Axis; Platform; Range of Motion; Tissue Mechanics; Neck Mechanics; Shoulder Mechanics; Thoracic Mechanics; Lumbar Mechanics; Hip Mechanics; Knee Mechanics; Mechanics of Resistance Training; Mechanics of Musculoskeletal Injuries; Mechanics of Running; Mechanics of Hitting; Mechanics of Kicking; Applications to Daily Life; Mechanics of Lifting; Mechanics of Balance; Gait Analysis; Mechanics of Footwear.

ANA 503 Physiology I 3+0 5,0
Physiology I: Functional Control of Human Body; Cell; Structure, Organization and Function, Cell Membrane Structure and Function: Transport of Ions And Molecules Across The Cell Membrane; Membrane Potentials and Action Potentials; Stimulation and Skeletal Muscle Contraction; Stimulation Contraction and Smooth Muscle; Stimulation and Contraction of The Heart Muscle; Cardiovascular System and Regulation; Kidney and Body Fluids; Regulation of Acid-Base Balance; Carbohydrate, Lipid and Protein Metabolism.

ANA 504 Physiology II 3+0 5,0
Physiology II: Respiratory and Regulation; Pulmonary Ventilation, Pulmonary Circulation, To the Pulmonary System of the Gas Diffusion Mechanism: Organization of the Nervous System; Sensory Receptors and Neuronal Circuits, Spinal Cord Motor Function and Control, Brain Sections and Control: Endocrine System, Endocrine System Hormones and Release Controls, Hormones of the Endocrine System Functions.

BES 501 The Organization and Leadership in Sport 3+0 7,5

The process of transformer leadership, Organizational activities which are effect transformer leader ship, Definition of organization in sport, Relations of organizations with external environment according to their characteristics; Stages of sport organization activities; Group structure of organizations and communication; Regeneration process of sport organizations, importance of leadership in sport, Types of leadership: Difference of manager and leader, Duties and Functions of leader; Transformer leadership definition.

BES 504 Sport Medicine 3+0 7,5

The history of sport medicine and its importance; Assessment of athletes and general principles of measurement, Assessment of athletes in different sports and disabled persons and measurement methods , Nutrition of athletes, Doping and doping control of athletes. Health knowledge and its education, Inspection of athlete's health, Game rules, Equipment of sport, Field of sports, Worming, Cooling and Stretching activities.

BES 505 Protection Sport Accidents and Treatment Approaches 3+0 5,0

Reason of sport accidents, sport accidents according to sport branches, classification of sport accidents according to their reasons, First aid, Treatment of sport accidents, Education of returning in sport and its erections, Recovering in flexible tissue accidents, Flexible and strength Education, Rehabilitation in Racquet and ballistic sports, Accident in swimming, Accident in scuba, Accident in body building.

BES 506 Seminar 3+0 7,5

BES 508 Exercise Physiology 3+0 5,0

Starting in Exercise Physiology, Acute Physiological conclusion of exercise, Chronic physiological adaptation to education, Basic education principles, Muscular Control of movement, Neurological control of movement, Neuromuscula radaptation to resistant education, Basic energy systems and metabolism, Hormonal responses toexercise, Metabolic adaptations to education, Hearth and Circulatorycontrolling in exercise, Respiration control and its organization, Heart and circulatory adaptations to education.

BES 509 Sports for Disability Persons 3+0 5,0

History of disability sports, General rules of Paralympics games, Paralympics sport foundations, Definition of disability person and classification, Effect of exercise education in Disability persons, Physical adaptation programs for disability persons, Dance activities for disability persons, Adapted sport activities for different disability persons, Sport accident and rehabilitation for disability athletes, Doping for disability athletes, Specific Olympic.

BES 510 Operation of Sport Foundations 3+0 5,0

The characteristic which are take in to consideration on organizations which are doing in sport foundations Characteristics of sport foundations and technology, classification of management structures in sport foundations, Consumer Behavior for using sport foundations, Definition of sport consumer and determination of aims, subject which are take into consideration for demographic consumer profiles, Importance of service quality in sport foundation.

BES 511 Sport Marketing 3+0 5,0

Importance of marketing rules and applications in sport, Marketing mix and its importance in sport, Characteristic of sport marketing, Sponsorship and promotion techniques in sport industry, Planning and application, Developments in sport marketing, Literature of sport marketing, Case studies and group working.

BES 512 Sports Economy 3+0 7,5

What is economy? Some basic concepts, Same economical problems of all communities, Mechanism of price: Petition, Demand, Public place price, Flexibilities, Consumer behaviors, Production and association balance, Whole challenge, Monopoly, Oligopoly and monopolistic challenge, Factory price and income allocating, Price mechanism and general balance, Application of micro economic subjects according to sport activities; Macro economy: Employing, Money and banking system, Inflammation, International commercial finance, Application of macro economic subjects according to sport activities; Reflection of basic economical developments to sport, Place of sport for creating income and employing.

BES 513 Sport Management 3+0 7,5

Management, Basic concepts, Characteristic of sport activities, Historical development of management science; Period of early scientific, scientifically management, Movement of scientifically management, Management process approaching, bureaucracy approaching, Human relationship approaching: Research of Hawthorne, Studies of Harwood, Modern management: System approaching, Modern management approaching, Sport management, Development of sport management, Sport management and manager, Planning in sport management, Organization of sport management, Leadership in sport management, Coordination and controlling in sport management.

BES 514 Relationship Between Sport and Media 3+0 5,0

Sport which is recreational, entertainment and professional area for analyzing in mass media, Definition of sport, History, Development in world and Turkey, Definition of communication and its concept, Mass media tools, Its characteristics, Functions, Concepts and definitions, Athlete-manager, athlete-athlete, athlete-spectator, athlete-referee, athlete-primary and secondary groups in sport, personal and interactive communication.

BES 515 Public Relations in Sport 3+0 7,5
Definition of public relations and mix, Historical development of public relations in Turkey and world, Placement and importance of public relations department in sport organization, Using sport as a public relations tool in public and private sector, Public relations tools: Calligraphy tools, Visual-Auditory tools, Other tools, Theories which are using in public relations and sport applications Communication stages in public relation campaigns which are using in sport organizations: Definition of problem, Determination of aims, Defining of target audience, Determination of message, Tactics and tools.

BES 516 Motivation in Sport 3+0 5,0
Definition of motivation concept: Definition of spur, incentive, motive and need, Development of motivation, Personal motivation and corporation communication, Development of motivation theory, Process and concept theory in motivation, Usage techniques of motivation in sport, Encouragement tools which are getting motivation, Easy motivation methods which are using in corporation motivation, Important components in athlete motivation.

BES 517 Sport Physiology 3+0 5,0
Exercise and thermoregulation; Hypobaric, Exercise in hyperbaric and microgrative setting, Boundaries of exercise education, Performance and ergojenic supplements, Nutrition, Optimal body weight for performance, Growing, Improvement and young athletes, Elderly and elderly athletes, Women athlete and gender difference, Exercise recipe, Obesity, Diabetic and Physical activity.

BES 518 Physical Appropriateness 3+0 5,0
Definition of physical appropriateness and historical development, Physical appropriateness and education, Physical appropriateness criteria for general health, Physical appropriateness criteria for performance, Physical appropriateness for children, Physical appropriateness for elderly, Physical appropriateness criteria for disabilities person and physical appropriateness tests, European physical appropriateness norms and physical appropriateness tests, American physical appropriateness norms and physical appropriateness tests.

BES 520 Experimental Applications in Sportive Performance 3+0 5,0
Experimental approach to sportive performance. Measurement and assessment of somatotype and body fat percentage. Measurement and assessment of speed performance, isokinetic strength, squat, countermovement and drop jump power. Use of photocell, anemometer and thermo-anemometer. Wingate test and use of Peak Bike. Conconi test and use of Polar heart rate monitor. Use of Lactate threshold field test and YSI lactate analyzer. Use of VO2max field test and K4b2 O2 analyzer. Motion analysis through image and use of SIMI motion analysis programme.

BES 521 Term Project 3+0 15,0

BES 522 Experimental Approach to Exercise Neurophysiology 3+0 5,0
Elective: The Concept of Motor Unit. Functions of different motor units. Electromyography (EMG). Filtering and absolute values. Integration and normalization. Assessments of muscular fatigue, contraction and relaxion through EMG data. Assessment of reflexive muscular activity by EMG. Methods in brain research and measurement of electrical activity of the brain. Stimulated brain potentials: Assessment of attention and cognitive processes. Assessment of central fatigue by EEG.

BES 523 Introduction to Exercise Neurophysiology 3+0 5,0
Skeletal muscle: Structure, Muscle-neuron connection, contraction mechanism. The basics of action potential. Testing of action potential. Muscle receptors: General classification and characteristics of muscle receptors (muscle spindle, golgi tendon organ etc). Muscle motor unit: Motor unit constructors of fast- and slow-twitch muscles. Elements of brain anatomy and functions of brain parts. Basic approaches to the concept of movement. The basics of multi-joint movements. The concept of depth perception in sportive activities.

BES 524 Advanced Training Theory 3+0 5,0
Training and Basic Principles of Training; Loading and Adaptation; Effects of Training; Immediate; Residual and Cumulative Effects of Training; Structure of Muscular Strength and Strength Development Training; Types of Strength; Static and Dynamic Muscle Activation; Training Methods Developing Strength; Structure of Speed and Speed Development Training; Types of Speed; Factors Influencing Speed; Training Methods Developing Speed; Structure of Endurance and Endurance Development Training; Types of Endurance; Factors Influencing Endurance; Training Methods Developing Endurance; Structure of Flexibility and Flexibility Development Training; Types of Stretching; Factors Influencing Flexibility; Training Methods Developing Flexibility; Training Planning; Annual Plan; Unit; Microcycle; Macrocycle; Mesocycle Training; Combined Training; Altitude Training; Competition Training; Training Control Methods; Practical Performance Tests; Training Control Meth

BES 525 Talent and Talent Identification for Sports in Children 3+0 5,0
Biomotor abilities, Biomotor abilities in developmental stages of children; speed, strength, endurance, flexibility and coordination. Multi-faceted development of children. Identification and orientation, and internal and external factors to orientate a special ability in children. Different approaches to talent identification for children with special talent. The situation in Turkey and long-term aims for talent identification.

BES 526 Motivational Orientations in Sport 3+0 5,0
Motivational Orientations in Sports: The Dynamics of Motivation in Physical Activity; Motivation in Children's

Development; Success in Sports and Target Research; Goal Setting in Sport and Physical Activity; As A Determinant of Exercise Self-Efficacy; Intrinsic and Extrinsic Motivation in Exercise and Sport; Motivational Strategies in Team and İndividual Sports; Fitness in the Perceptual Control.

BES 527 Basic Training Theory 3+0 5,0

Human Body and Functional Movements; Axes; Basic Structure; Joint Actions; Upper and Lower Extremity; Growing Stages in Children; Pre-Puberty; Puberty; Post Puberty; Physiological Changes in The Growing Children; Peak Height Velocity; Psychological Changes in Growing Children; General Psychological Development; Motor Learning Characteristics; Learning and Technical Training; Concept of Learning; Aims of Technical Training; Basic Movement Mechanics; Concepts of Movement and Laws of Motion; Muscle and Types of Muscular Activities; Energy Systems; Oxygen Transport System; Maximal Oxygen Consumption; Body Liquid Systems; Homeostasis; Liquid Accumulation and Loss; Temperature Regulation; Hormones; Local and General Hormones; Secreting Glands; Nutrition; Carbohydrates; Fats; Proteins; Minerals; Vitamins; Nutritional Intake for the Athletes; Internal and External Factors Influencing Athlete Training; Training and Basic Principles of Training; General S

BES 528 Planning and Evaluation in Physical Education Teaching 3+0 5,0

Planning and Evaluation of Teaching Physical Education: Basic Concepts Related To Education; Teaching-Learning Process and Components: Teaching Purposes, The Selection of Content and Regulation, State Regulation of Education, Teaching Methods and Techniques, Instructional Strategies, Teaching Models, Teaching Tools and Materials, Evaluation of Student Achievement, Classroom Management.

BES 530 Antioxidants and Athletics Performance 3+0 5,0

Concept of Free Radical: Structures and properties of free radicals, Production and metabolism of free radicals; Exercise and Oxidative stress: The effect of aerobic and anaerobic exercises on radical production and oxidative stress; The Antioxidant Defense System: Production of free radicals and cellular defense, Enzymatic and non-enzymatic antioxidants, Vitamins as antioxidants, Reversible and irreversible reactions of antioxidants, Nutrient source of antioxidants; Antioxidants Supplementations and Performance: Positive and negative effects of antioxidant supplements on athletic performance, Pro-oxidant effect of antioxidants.

BES 531 Exercise and Sport Psychology 3+0 5,0

Exercise and Sport Psychology: The Emergence of the Concept of Sport and Exercise Psychology; Sports Psychology Related Concepts; Exercise and Sport Psychology of Relationships With Each Other; Of The Stages of Sport and Exercise Psychology; Exercise and Sport Psychology Has Undergone An Evolutionary Process of Knowledge; Affecting the Performance of Exercise and Sport Psychology Psychic Elements; Applications in Order To Increase Performance.

BES 533 Introduction to Research Methods and Technics in Sports 3+0 7,5

Introduction to Research Methods and Technics in Sports: Methods and Techniques of Scientific Research in Sport; Should Be in A Scientific Research on the Content and Format of Knowledge, Skills, Attitudes and Behaviors; Research Problems, Objectives and Sub-Objectives, Importance and Assumptions; Research Models Frequently Used in the Field of Sports; To Be Considered in the Research Process, Ethical Principles, Rights and Responsibilities.

BES 535 Movement Science and Performance Training 3+0 5,0

Performance Training: New approaches on performance training; Programming performance training for individual and team sports; Evaluating the sports performance at the laboratory and field environment; Motion: Motion forms; Motions performed that two and three dimensions; Theoretical approaches and modern systems on motion analysis; Processes of motion analysis; Using required tools of motion analysis; Examining of sports techniques via motion analysis: Specific motion analysis of individual and team sports; Examining training effects via motion analysis system; Reporting the outcomes of motion analysis on training effects.

BES 537 Analysis of Sportive Technique 3+0 5,0

The Concept and Mechanics of Movement: Axes and Planes in Defining Movement, Kinetic and Kinematic Variables, the Concepts of Technique and Skill; Analysing Technique with Qualitative Methods: Video-based Data Recording and Observation, Establishing Strengths and Weaknesses of the Technique, Giving Feedback on the Ideal Technique; Analysing Technique with Quantitative Methods: Synchronizing High-speed Cameras, Surface Electromyography, Force Plate etc., Dividing Sport-Specific Technical Skills into Phases, Analysing Technique with Basic Kinetic and Kinematic Methods.

BES 539 Motor Control of Human Movement 3+0 5,0

Basic Concepts of Motor Control; Perspectives of Neuroscience: Components of the nervous system, Nervous System, Neurons and Synapses as an Elaborate Communications Network:, Sensory and effector systems for movement, Motor control functions of the spinal cord and brain, Integrative brain mechanisms for movement; Basic Concepts of Motor Control: Cognitive Science Perspectives, models Used for motor control Studies, Motor Control Changes throughout the Life Span: Changes in observable motor Peformance, neurophysiological and information processing, Motor Control Adaptations to Training: Factors affecting the learning of motor skills.

BES 601 Teaching Methodology in Physical Education and Sports 3+0 6,0

Education and Teaching; Learning and Teaching; Basic Concepts about General and Special Teaching Methods; Principles, Aims, Content, Learning and Teaching Processes of Physical Education and Sports Teaching; Planning and Performing Physical Education and Sports Activities; Writing Overall and Behavioural Objectives; Organızation of Content; Teaching Strategies, Methods and Techniques in Physical Education and Sports; Selection and Evaluation of Course Materials in Physical Education and Sports Teaching; Assessment of Students Success in Physical Education and Sports Teaching; Micro-Teaching Practices and Evaluation.

BES 602 Statistical Decision Making Techniques 3+0 6,0

Sampling Theory: Sampling techniques, Sample selection; Statistical Estimation: Point and interval estimation; Statistical Decision Making; Hypothesis Testing; Small Sampling Theory; Time Series Analysis; Least Squares; Linear Relations; Indexes; Types of Indexes; Regression and Correlation Analysis: Linear regression, Correlation, Chi-square test, Chi-square goodness of fit tests, Independence, Homogenity, Bayes' theorem; Decision Making: Alternative strategies, Events, Uncertainty, Decision making under uncertainty.

BES 603 Advanced Exercise Physiology 3+0 6,0

Introduction to Exercise Metabolism; Introduction to Skeleton; Skeletal Muscle Metabolism of Exercise; Skeletal Muscle Energetics of Exercise; Skeletal Muscle Activation and Control of Exercise; Physology of Skeletal Muscle; Adaptation Responses of Cardiopulmonary, Endocrine and Immune Systems to Exercise and Training; Critical Analysis of Adaptation Repsonses of Cardiopulmonary, Endocrine and Immune Systems to Exercise and Training In View of Current Literature (Journal Articles).

BES 604 Seminar 3+0 6,0

Ability Selection in Sports; Heat Shock Proteins; Aquatic Exercises for the Disabled; Status of Physical Education and Sports Teachers in Turkey; Training Periodization; Teaching Methods for the Disabled; Ergogenic Aids; Excitation-Contraction Mechanisms of Skeleton Muscles; Cardio-Vascular Adaptation to Exercise; Financing of Sports Activities; Points to Consider in Physical Education and Sports Management.

BES 605 Skill Learning in Sports 3+0 6,0

Learning Process, Learning Approaches and Processes; Individual Differences and Characteristics in Skill Learning; Definition of Movement; Effects of Movement on Ego: Role of Feedback in Skill Learning; Perception and Memory in Skill Learning; Acquirement of Motor Skills; Neurological Schema Theory; Reaction Time and Testing Methods; Motivation and Stress in Skill Learning; Cognitive Development in Skill Learning; Anxiety and Fear, Skill Teaching for the Disabled.

BES 606 Curriculum Development in Physical Education and Sports 3+0 6,0

Basic Characteristics of Physical Education and Sports Programs; The Factors Important in Curriculum Development in Physical Education and Sports; Curriculum Development in Physical Education and Sports; Curriculum Development Process; Components of the Curriculum; Development of Objectives; Development of Content; Development of Teaching and Learning Processes; Development of Evaluation Techniques; Problems in Curriculum Development.

BES 607 Sports for the Disabled 3+0 6,0

Program Organization and Management in Adapted Physical Education and Sports; Individualized Education Programs; Testing and Evaluation; Sports Organizations; Instructional Strategies for Adapted Physical Education; Disabled People: Mental retardation, Learning difficulties and attention deficiency, Behavioural disorders, Visual impairment and Deafness, Cerebral palsy, Traumatic brain injury, Amputations, Spinal cord disabilities; Developmental Considerations; Activities for the Disabled: Physical fitness, Rhythm and dance, Aquatics, Team sports, Winter sports activities; Enhancing Wheelchair Sports Performance.

BES 608 Advanced Biomechanics 3+0 6,0

Basic Concepts of Biomechanics; Vector Processing; Some Special Forces: Division of a force into components; Statics; Newton's First Law; Rotation Moment; Bending Moment; Transverse Force; Functional Adaptation; Dynamics; Newton'sSecond Law; Work and Energy in Living Things; Biomechanics of Walking; Flexibility; Stress-Strain; Bone Tissue; Muscles; Tendons and Ligaments; Viscoelastic Behavior; Viscoelastic Models.

BES 611 Advanced Anatomy in Sports 3+0 6,0

Locomotor System; All Body Bones; All Body Joints; Joint Ligaments; Joint Movements; Muscles That are Active Parts of the Locomotor System; Origin and Insertion of Muscles; Functions of Muscles with Joints; Motor Neurons of Muscles; Basic Movements in Different Sports and Effective Muscles in These Movements; Clinical Evaluation of Sports Injuries.

BES 612 Neuromuscular Adaptation and Fatigue 3+0 6,0

Introduction to Nervous System; Introduction to Muscle Physiology; Skeletal-Muscle Mechanisms; Muscle Physiology of Strength, Speed, Power and Endurance Performance; Definitions of Strength, Speed, Power and Endurance; Differences Among Muscular Strength, Endurance, and Power; Neural Activation in Strength, Speed and Power Performance; Motor Units; The Effect of Contraction Type on Motor Unit Activation;The Effect of Contraction Speed on Motor Unit Activation; Neuromuscular Adaptation in Physical Work; Definition of Fatigue; Causes of Fatigue; Fatigue in Strength, Speed and Power Performance; Recovery.

BES 613 Biochemistry of Exercise 3+0 6,0
Carbohydrates; Lipids; Proteins; Nucleic Acids; Vitamins; Hormones and Hormonal Responses to Exercise; Minerals; Enzyme Kinetics; Anaerobic and Aerobic Glycolysis; Beta Oxidation and Lipogenesis; Urea Synthesis; Oxidative Phosphorylation; Basic Principles of Sports Nutrition; Biochemistry of Muscle, Adipose, Endothelium, Bone and Nerve Tissues; How to Meet Energy Requirements of Tissues in Case of Starvation, Satiety and Long-term Starvation; The Effects of Exercise on Biochemical Parameters.

BES 614 Substance Use in Sports 3+0 6,0
Definition of Doping; Factors that Cause Doping Use; Ergogenic Aids; Classification of Substances; Prohibited Substances: Stimulants, Narcotics, Cannabinoids, Glucocorticosteroids, Anabolic agents, Peptide hormones, Agents with anti-estrogenic activity, Beta-2- agonists, Diuretics and other masking agents; Prohibited Methods: Enhancement of Oxygen Transfer: Blood doping, Modified hemoglobin products, Pharmaceutical, chemical and physical manipulation, Gene doping; The Effects and Damages of Doping Materials on Human Organism; Doping Control.

BES 616 Medical Subjects in Sports and Health Organizations for Athletes 3+0 6,0
Health Care System for Athetes: Roles, Relationships and Organizations; Epidemiology of Sports Injuries; Injury Prevention: Environmental factors, Equipment, Condition; Evaluation and Rehabilitation in Sports Injury; Special Considerations: Diabetic athletes, Blood pressure disorders, Sudden death; Participation into Exercises in Different Groups: Risks and Benefits of Exercise; Contraindications; Pre-Exercise Evaluation Methods and Exercise Prescriptions; Pharmacology and Drug Taking; Child and Adolescent Athletes; General Health Condition and Environmental Injuries.

BES 617 Adaptation to Strength Training 3+0 6,0
Strength; Types of Strength Training; Biological Fundamentals of Strength Training; Miogenic and Neurogenic Effects of Strength Training; The Biomechanics of Resistance Exercises; Prenciples of Strength Training; Methods of Strength Training; Characteristics of Neuromuscular Structure Spesific to Strength Training; Effects of Nutrition to Strength Training Adaptation; Alterations in Strength by Combined Training; Detraining; Strength Training to Age Groups; Strength Training Spesific to Sports; Periodization of Strength Training; Alterations Related to Strength Training in Women; Responses to Strength Training in Elder People.

BES 618 Approaches in Sports Psychology 3+0 6,0
Introduction to Sports Psychology; Problem Areas in Sports Psychology; Sports Psychology Research; Learning and Learning Theories in Sports ; Motivation in Sports; Feelings and Emotions; Personality and Sports; Anxiety and Stress in Sports; Body Image and Ego in Sports; Group and Group Dynamics in Sports; Motivation in Sports; Motivation Theories and the Effects of Motivation Theories on Sports; Psychological Preparation in Sports and its Methods; Objective Setting in Sports; Performance Enhancement; Coaching Psychology; Leadership in Sports; Aggressiveness in Sports.

BES 619 Training Theory I 3+0 6,0
The Concept of Training; Loading and Recovery; The Structure of Efficiency; The Concept of Performance: Performance Follow-Up, Evaluation of Performance, Factors Affecting Performance; Basic and Secondary Principles of Training; The Relationship between Loading and Resting; Recovery and Planning; Periodization; Structure of Microcyle; Structure of Mesocyle; Structure of Macrocyle; Single- and Multi-Periodization; Children and Training; Stages of Development and Training; Biomotor Characteristics and Training; Talent Selection and Talent Orientation; Antropometry; Endurance Development; Physiology of Endurance; Maximal Oxygen Consumption; Anaerobic Threshold; Running Economy; Training Methods in Endurance Development .

BES 620 Training Theory II 3+0 6,0
Strength Development: Physicomechanical bases of strength, Various types of strength, Measurement of Strength, Periodization of Strength, Strength in Various Sports; Speed Development; Physicomechanical Structure of Speed, Factors affecting Speed, Speed training exercises, Speed tests, Anaerobic strangth and capacity; Flexibility Development: Flexibility and its physicomechanical characteristics, Various types of flexibility, Flexibility training; Training and Children; Training and Stages of Development; Biomotor Characteristics and Training; Talent Selection and Talent Orientation; Antropometry, Training and Fatigue; Loading/Recovery/Fatigue; Control of Fatigue: Planning the training process; Control of Fatigue: Active/passive rest; Control of Fatigue: Nutrition and periodization; Form Training: Volume, intensity and frequency relations, Planning form training; Altitude Training and Periodization; Women Athletes and Trainig: Menstruation, repose and sleep.

BES 621 Sports Sociology I 3+0 6,0
Social change and cultural implications of change; the characteristics of pre-industrial and modern sports; socialisation and sports; social classes in sports; gender and sports; national identities and sports; sports and collective behaviors; media and sports; sports, the state and politics; sports, work and economy; commercialisation and political economy of sports.

BES 622 Sport Sociology II 3+0 6,0
Sports in sociological theory, gender in sports; masculinity, sports and body from the feminist perpective; globalization-sports relations.

BES 623 Experimental Approaches in Physical Education and Sports I 3+0 6,0
Physical education and individual, Physical education and society, Needs and interests of students, Objectives,

Resarch fields in physical education and sports, Historical, descriptive and experimental research, Curriculum development and evaluation, Curriculum development and research, Test development and research, Test development and analyses.

BES 624 Experimental Approaches in Physical Education and Sports II 3+0 6,0

The introduction and application of experiment-oriented methods in Sports Education; Field research and its analysis; Planning, carrying out and evaluating experimental research in sports.

BES 625 Qualitative and Quantitative Research Approaches 3+0 6,0

Research Approaches: Quantitative approaches, Qualitative approaches; Comparison of Quantitative and Qualitative Approaches; Qualitative Research Designs: Phenomenology, Ethnography, Netnography, Grounded theory, Narrative research, Case study; Qualitative Data Analysis: Descriptive analysis, Content analysis; Quantitative Research Designs: Experimental model, Descriptive model, Correlational model, Causal-comparative model; Quantitative Data Analysis: Interpretive analysis, Statistical analysis; Mixed Research Approaches (Triangulation Strategy).

BES 626 Contemporary Approaches in Sport and Exercise Psychology 3+0 6,0

Contemporary Approaches in Sport and Exercise Psychology: Exercise Psychology: Definition, Emergence and Development; Sports Psychology: Definition, Emergence and Development; Differences in Exercise and Sport Psychology; Traditional and Contemporary Approaches To Exercise and Sport Psychology; Exercise and Sport Psychology Knowledge of How To Follow A Path That; What Suggestions As To What Cases Brought; Describes the Definition of Sports Psychologist.

BES 627 Social Psychology of Sport 3+0 6,0

Social Psychology of Sport: Sociology, Psychology, Attitudes, Behavior, Social Effects, Social Cognition and Perception: Social Psychology and Social Psychology of Sport; Group Dynamics and Team Dynamics; Group Integrity; Social Loafing and Social Acceleration Theory Theory; Success in Sports and Target Research; Leadership, Groups and Group Communication in Leadership and Leadership Models and Their Properties.

BES 628 Arousal Theories in Sport 3+0 6,0

Arousal Theories in Sport: Arousal Concepts and Definitions; Arousal in Sports Media; Stress and Coping in Sport; Anxiety in Sport: Anxiety Theories and Measurements; Competition; Relationship Between Anxiety and Performance in Sport; Relationship Between Anxiety End Attention in Sport; Relationship Between Anxiety End Burnout in Sport; Anxiety Control; Fear And Anxiety in Top-Level Athletes Training Arrangements.

BES 629 Research Methods and Techniques in Sports 3+0 6,0

Research Methods and Techniques in Sports: Sports Scientific Research Process Stages; Research Problem, Purpose and Sub-Objectives, Importance and Assumptions Literature To Be Aware of Specifications, The Research Model, The Universe and Sample, Data Collection Methods and Research Data Gathered in The Sports Field Is A Problem Scientific Research, According To The Methods and Techniques To Solve Advanced Proficiency.

BES 630 Exercise Approaches for Special Groups 3+0 6,0

Exercise Approaches for Specific Groups: Exercise Management; Exercise As A Treatment; Children and Teenagers Exercise; Women in the Exercise; Exercise in the Elderly; Metabolic Syndrome and Exercise; Obesity and Exercise; Anemia and Exercise; Asthma and Exercise; Diabetes and Exercise; Hypertension and Exercise; Fibromyalgia and Exercise; Hyperlipidemia and Exercise; Chronic Fatigue Syndrome and Exercise.

BES 631 Instructional Models for Physical Education 3+0 6,0

Instructional Models for Physical Education: Teaching the Basic Concepts and Teaching-Learning Relationship; Teaching the Basic Features of the Model: Direct Instruction, Individualized Instruction, Cooperative Learning, Sports Training, Peer Teaching, Teaching Through Research, Strategy Game, Personal and Social Responsibility Model, Basic Properties, Advantages and Limitations; To Be Taken Into Consideration in the Selection of Teaching Models Principles; The Steps Followed in the Implementation of the Teaching Model; Comparison of the Instructional Model.

BES 632 In Biological Systems Methods of Analysis of Reactive Oxygen Species 3+0 6,0

In Biological Systems Methods of Analysis of Reactive Oxygen Species: Reactive Oxygen Species and Free Radicals Resources; The Effects of Free Radicals; Quantitative Analysis of Reactive Oxygen Species in Biological Systems, Methods; Analysis of Markers of Lipid Peroxidation; Analysis of Protein Oxidation Reagent; Analysis of DNA Damage Markers; Antioxidant Enzyme Analysis; Pro-Oxidant Effect of the Antioxidant Added.

BES 633 Exercise Prescription 3+0 6,0

Exercise Prescription: Activity Models of Guidance and Risk Levels; Exercise and Quality of Life; Exercise Tests and General Principles; Assessment and Exercise Prescription Principles; VO2 Based Exercise Prescription; By Cardiorespiratory Fitness Exercise Prescription; Exercise Prescription Based on Perceived Exertion; According To the Load of Exercise Prescription; Prescribing Exercise To Lose Weight; By Cardiovascular Endurance Exercise Prescription; Exercise Prescription for Muscle Strength; Exercise Prescription for Flexibility and Balance; Individual Evaluation and Testing.

BES 635 Anti-Aging and Exercise 3+0 6,0
Anti-Aging and Exercise: Age Period and the Classification of the Aging Process; Theories Related To the Aging Process; Aging Physiology; Aging in the Process of Cardiopulmonary, Skeletal Muscle and Nervous System Changes: Old Age and the Effects of Exercise; Old Age, Illness And Exercise; In Old Age the Basic Principles of Exercise and Exercise Prescription; Cardiovascular Exercise Programs for Older Individuals; Aged for Muscle Strength Exercise Programs for Individuals; For Elderly Individuals for Flexibility and Balance Exercise Programs; Old Age, Risk Factors and Mesasures of Exercise in the Process Are Explained.

BES 637 Exercise and Oxidative Stress 3+0 6,0
Exercise and Oxidative Stress: Reactive Oxygen Species and Free Radical Concept; Antioxidant Defense System; Oxidative Stress; Mechanism of Free Radical Production During Aerobic and Anaerobic Exercise; Reactive Oxygen Species and Skeletal Muscle Function; Fatigue Mechanism and Delayed Muscle Pain Syndrome; Antioxidant Defense System in Response To Acute and Chronic Exercise; Exercise, Oxidative Stress and Antioxidant Supplementary.

BES 790 Thesis 0+1 30,0

BES 890 Thesis 0+1 30,0

BES 890-0 Thesis (Thesis Proposal) 0+1 30,0

BİY 503 Laboratory Techniques in Biochemistry I 3+0 7,5
The Measurement of Biochemical Materials in Laboratory: Preparation of solutions, Determination of quantity of cellular proteins, Purification of proteins, The characteristics of proteins, The techniques of centrifuge; Electrophoresis: The identification of antibodies, The utilization of antibodies in electrophoresis, Preparation of gel, Western blotting; Spectrophotometre: The mesurements of intracellular calcium ions, The collection of data.

BİY 504 Laboratory Techniques in Biochemistry II 3+0 7,5
Experimental Studies with Enzymes: The regulation of enzyme functions, The activation of enzymes, The measurement of enzyme activation, Characteristics of enzyme, Stimulating molecules of enzyme; The Isolation of DNA From Cultured Cells: The preparation of cell pellet, Lysis of cells, Phenol extraction, Ribonuclease treatment, The relations of DNA and restriction enzymes, Run DNA on agarose gel, Southern blotting.

BİY 532 Introduction to Biochemistry I 3+0 7,5
The Investigation of Molecular Architecture of Living Matters: Nucleic Acids: Properties of the nucleic acids, The biological functions of nucleic acids, Transcription, Translation; Proteins: Aminoacids, The three-dimensional structure of proteins, Protein function, The function of protein in cell motion; Carbohydrates, Lipids, Communication Between Cells, Enzymes: Biological catalysts, Functions in metabolism.

BİY 533 Introduction to Biochemistry II 3+0 7,5
Dynamics of Life, Biosynthesis and Utilization of Molecules: Carbohydrate Metabolism: Anaerobic Fermentations, Citric acid cycle, Pentose phosphate pathway, Biological oxidations, Carbohydrate biosynthesis; Lipid Metabolism: Fatty acids, Lipoproteins, Cell membrane lipids, Steroids; Genetik Information Transfer: Replication, Restriction enzyme, Recombination, Synthesis of proteins.

BİY 536 Seminar 3+0 7,5

BİY 559 The Biology and Mechanisms of Apoptosis 3+0 7,5
Molecular Mechanisms of Apoptosis; Caspases, Caspases Substrates; Generation of Death Signaling; The Death Receptors; Biological Function of Death Receptors; Death Receptor-Associating Molecules; The Cell Cycle and Apoptosis; The Bcl-2 Protein Family.

BİY 566 Cellular Adhesion Molecules 3+0 2,5
Description of Cellular Adhesion Molecules; Their Functions; Cadherins: Structure of cadherins, Functions of cadherins; Selectins: Structure and functions of selectins; Immunoglobulin Superfamily Adhesion Molecules: ICAM-1 and ICAM-2, VCAM-1, PECAM-1; Integrins: Mechanisms of integrin-ligand binding, Integrin-mediated signal pathways, Integrins in metastasis; Extracellular Matrix Proteins: Structure and function of extracellular matrix proteins; Fibronectin, Vitronectin, Collagen Protein, Laminin.

BİY 568 Free Radicals and Antioxidants 3+0 5,0
Free Radicals in Human Biochemistry: Structure of Free Radicals, Their Sources and Reactions; Biochemistry and Sources of Reactive Oxygen Species; Metal-induced Oxidative Stress and Cancer, Oxidative Damage to Biomolecules: Mitochondrial DNA damage, Lipid peroxidation, Proteins; Reasons of oxidative stress; Cell Signaling and Cancer: Cytokines, p53; Carcinogenesis and Level of Carcinogenic Effect and Level of Free Radicals at Various Stages of Carcinogenic Process; Antioxidant Defense Mechanisms in Carcinogenesis; Antioxidants as enzymatic: SOD, CAT, GPx; Antioxidants as non-enzymatic: Ascorbic acid, tocopherols, GSH and CoQ10.

BİY 569 Vitamin Biochemistry 3+0 5,0
Information about Biochemistry of Vitamins; Fat-soluble vitamins (A, D, E, K), Their physical characteristic, Chemical and functional structures; Water-soluble vitamins; Their physical characteristics, Chemical structure (thiamine, niacin, biotin, pantothenic acid, riboflavin etc.), Chemical reactions; The Effects and Uses of Vitamins on Clinical;

Vitamins needed by Normal Metabolisms; Pathological Situations in Deficiency of Vitamins.

BİY 576 Target Enzymes in the Treatment of Diseases 3+0 7,5

The Importance and General Properties of Enzymes; Regulation of Enzyme Activities; Enzymes Have a Role In Alzheimer?s Disease; Enzymes Have a Role In Hypertension and Hyperlipidemia; Enzymes Have a Role Inflammation and Pain; Enzymes Have a Role In Diabetes Mellitus; Enzymes in Cathecolamine Metabolism; Phophodiesterases; Matrix Metalloproteinases; ATPases.

BİY 587 Biochemistry of Enzyme 3+0 7,5

Definition of Enzyme and Classification of Enzymes; Chemical Structure of Enzymes; Effect Mechanisms of Enzymes; Regulation of Enzyme Activity; Factors Affecting Enzyme Activity; Methods Used for Determination of Enzyme Activity; Enzyme Activators and Inhibitors; Kinetics of Enzymes; Purifications of Enzymes; Enzymes Important for the Diagnosis of Diseases I; Enzymes Important for the Diagnosis of Diseases II; Utilization Areas of Enzymes.

BİY 588 Tissue Biochemistry 3+0 7,5

Biochemistry of Muscle Tissue: Structure of the muscle; Energy Metabolism of Muscle; Structure and Biochemistry of Extracellular Matrix; Biochemistry of Bone and Tooth Tissue: Structure of bone tissue, Bone formation, Metabolism of bone; Epithelial and Endothelial Tissues: Functions of epithelial tissues, Skin, Gastrointestinal system, Respiratory system, Kidneys; Functions and Structure of Endothelia: Cellular adhesion molecules, Endothelial dysfunction and activation, Endothelial and immune responses; Nervous System and Its Metabolism; Digestive System and Its Biochemistry; Biochemistry of Blood; Biochemistry of Vision.

BİY 589 Cytokines, Cell Growth Control and Concerned Diseases 3+0 7,5

Control of Cell Growth: Cell cycle, Progression and regulation of cell cycle, Cell proliferation; Cytokines: Classification of cytokines, Structure of cytokines, Synthesis and secretion of cytokines, General characteristics of cytokines, Effect mechanisms of cytokines, Cytokine-receptor families, Inhibitors of cytokines; Hematopoiesis and Cytokines; Bone Remodeling and Cytokines; Wound Healing and Cytokines; Immuno-inflammatory System and Cytokines; Fever and Cytokines; Acute Phase Reaction and Cytokines; Cancer and Cytokines; Cytokines as Tumor Markers.

BİY 701 Biochemical Approaches to Drug Design 3+0 7,5

Define the Molecular Mechanisms of Disease; Biochemical Factors Which Act on Dispersion of Drugs in to Tissue and Cells; Therapeutic Proteins; Enzyme İnhibitors; Enzymes in Therapy, İnhibitors and Toxins Which Depends on Mechanisms; Strategies for Drug Targets; Receptor Targets; Antigen and Antibody Reactions; Genes and Drug Therapy.

BİY 702 Enzymatic Biosynthesis 3+0 7,5

Enzyme Usage at Organic Synthesis; Hydrolitic Enzymes I; Hydrolitic Enzymes II; Isomerases and Liyases; Other Enzymes not Requiring Cofactor: Aldolases, Glycosyl Transferases, Glycosidases, Oxynitilase; Flavoenzymes; Pyridoxal Phosphate Enzymes; Metalloenzymes; Thiamine Pyrophosphate Dependent Enzymes; Other Enzymes not Requiring Added Cofactors: SAH Hydrolase, B12 Dependent Enzymes, PQQ (Methoxatin) Enzymes; Enzymes Which Require Cofactors: Kinases, Oxidoreductases, Methyl Transferases, CoA Requiring Enzymes, Sulfurylyases; Multienzyme Systems.

BİY 790 Thesis 0+1 30,0

BYK 601 Cell Biochemistry 3+0 7,5

Structures of Cell: Membrane structures, Cell organelles, Cell cytoskeletal proteins: Microtubule and their functions, Tubulin, Actin filaments and their functions; Intermediate filaments and their functions; Cell-Cell Interactions: Cell binding proteinleri, Tight junctions, Interconnect proteins; Protein Kinases Involved in Signal Transduction: Mechanism of activation and inactivation of protein kinases, MAP kinases, Protein kinase C; Membrane Lipid and Biological Roles: Phospholipids, Glycolipids, Cholesterol, Phosphoglycerides, Sphingolipids; Ions Related to.Extracellular Signal Transduction.

BYK 602 Biochemistry of Metabolic Diseases 3+0 7,5

Biochemical Basis of Metabolic Diseases; Carbohydrate Metabolism Disorders I; Carbohydrate Metabolism Disorders II; Lipid Metabolism Disorders; Fatty Acid Oxidation and Carnitine Disorders; Amino Acid Metabolism Disorders; Metal and Protein Disorders; Peroxisomal Disorders; Lysosomal Storage Diseases; Primary Lactic Acidemia; Diseases of Purin Metabolism; Disorders related to plasma proteins and immunoglobulins; The Instruments used in Laboratory of Metabolism; Biochemical Parameters Measured in Laboratory of Metabolism.

BYK 603 Oxygen Radicals in Biological Systems 3+0 7,5

Introduction to Biological radicals;types of oxygen radicals and mechanisms of formation; Superoxide Radical; Chemical Reactions in Which they Participate; Oxygen Toxicity, Effects of oxygen radicals in the cell, Lipid peroxidation; Nitric Oxide Formation and Effects; Peroxide Formation and Effects; Organism to Protect Itself Against Radicals; Free Oxygen Radicals in the Formation of Clinical Disease: Diseases related to free radicals and role of radicals in cancer; Radical Production and Aging; Determination of Radicals and Working Methods.

BYK 604 Biochemical Cascade Systems 3+0 7,5

Introduction to Cascade Systems; Cell Signal Transfer, Receptors; G-proteins and Second Massengers; Coagulation Cascade; Compleman Cascade; Vitamin A and D Cascades; Apoptosis Cascade; Arachidonic Acid Cascade; Insulin Cascade; Muscle Contraction; Growth Factors and

Cytokine Cascade Systems; Taste, Smell and Vision Cascade; Regulation of Glycogen; Leptin Cascade.

BYK 605 Cell Culture Techniques 3+0 7,5
Biology of the Cell Culture; Laboratory Design; Devices and Features used in the Laboratory; Aseptic Techniques; Safety, Bioethics and Validation; Preparation of Cell Culture Media; Sterilization Process; Primary Culture; Sub-Cell Culture and Cell Breeds; Cloning and Selection; Separation of Cells; Characterization of Cells; Transformation and Immortalization of the Cell; Contamination; Storage of Cells; Cytotoxicity; Culture Conditions of Tumor Cells; Organotypic Culture; Solution of the Problems in Cell Culture.

BYK 606 Seminar 3+0 7,5

BYK 607 Protein Biochemistry 3+0 7,5
Introduction to Proteins: Biomedical importance of protein, Classification, Structure, Structure-function relationships; Structure-Analysis Methods; Purification; Recognition; Protein Synthesis and degradation; Complementary Interactions between Proteins and Ligands; Plasma and Serum Proteins; Fibrous Proteins; Specific Proteins; Genetic Basis of Protein; Proteomics: Proteomic analysis methods, Proteomics research techniques, Using in clinical of proteomics.

BYK 608 Apoptotic Pathways in Cancer 3+0 7,5
Definition and Types of Cancer; Cancer Incidence and Mortality; Molecular Mechanisms of Cancer: Cell proliferation and regulation, Angiogenesis, Tumor invasion; Benign and Malignant Tumors; Mechanisms of Metastasis; Oncogene Activation Mechanism; Early Diagnosis and Treatment of Cancer; Apoptosis and Mechanism; Role of Apoptosis in Tumor Formation: Bcl-2 protein, p53 protein; Oncogenic Mutations in Apoptosis: c-myc, Retinoblastoma Gene and Function; Apoptosis and Cancer Therapy: Apoptosis Inhibition Mechanism, Apoptosis inhibitor proteins; Apoptosis and New Therapeutic Approaches.

BYK 609 Nutritional Biochemistry 3+0 7,5
Biochemical Effect of Nutrition; Regulatory Pathways of Nutrition; Macronutrients; Micronutrients; Nutrition and Energy Metabolism; Nutrients Affecting Immunity; Biochemical Importance of Supplemental Nutrients; Special Situations at Human Nutrition; Biochemical Markers at Nutrition; Pregnancy and Nutrition; Aging and Nutrition; Obesity; Metabolic Syndrom; Nutrition for Renal Disease.

BYK 610 Comparative Biochemistry 3+0 7,5
Comparative Biochemistry Methods; Nucleic Acids and Nucleoproteins; Structural Folding of Proteins and Metabolism; Plasma Proteins and the Metalloproteinases; Molecular Evolution; the Immunoproteins; Respiratory Pigments; Peptide Hormones; Extracellular Structure and Secretory Proteins; Comparison of Carbohydrates, Protein and Lipid Metabolic Pathways: Degradation products, Using in clinical of the products and interpretation.

BYK 611 Biochemistry of Immun System 3+0 7,5
Introduction to Immun System; Components of Immun System: Cells of immun system, Organs of Immun System; The Notion of Antigen; Immun Reactions: Cellular immun reactions, Humoral immun reactions; Immunuglobulins, Compleman System; Cytokines Acting in Immun System: Classifying of cytokines, Structures of cytokines, Inhibitors of cytokines.

BYK 612 Biochemical Omic Approaches 3+0 7,5
General Survey on Omic Sciences; Genomic; Transcriptomic: The technics of transcriptom; Proteomic; Proteom Studies and Stages, Proteomics in exploring tumor markers, Proteomics in prognosis of drug response, The technics of proteomics, Cancer and proteomics; Metabolomics; Epigenomics; Pharmacogenomics; Nutrigenomics.

BYK 613 Biochemical Mechanisms 3+0 7,5
Introduction to Metabolism; Signal Transduction Receptor Definition, Receptor-ligand interactions, Cellular responses; Glycolysis; Glycogen Metabolism; Gluconeogenesis; Calvin cycle; Fatty Acid Catabolism; Eiokosanoid Synthesis; Cholesterol Synthesis and Degradation; Catabolism of Amino Acids; Hemoglobin Structure; Hem Synthesis; Urea synthesis; Biosynthesis of Phenylalanine and Tyrosine; Tryptophan Biosynthesis; Beta-Oxidation of Fatty Acids; Beta-Oxidation of Fatty Acids Polyunsaturated; Enzymatic Control of Metabolic Activity; Regulation of Biochemical Mechanisms.

BYK 614 Recent Developments in Biochemistry 3+0 7,5
Recent Developments Related to the Biochemical Mechanisms of Health and Disease in Basic Biochemistry, Clinical Biochemistry and Molecular Biology Follow up and Investigate how to Apply Theoretical Knowledge to the Development of Medical and Pharmaceutical Field to Follow the Literatures and Making Research Published in Recent Literature on These Issues and Application to Health Science.

BYK 615 Separation by Capillary Electrophoresis Protein 3+0 7,5
Capillary Electrophoresis Application Principles and Applications Areas; Electrophoretic Motion; Protein Detection: Absorbance detection, Fluorescence detection, Detection of proteins by fluorescence indirectly; Separation of Proteins and Peptides: Parsing according to the load situation, Glycan analysis; SDS Capillary Gel Electrophoresis; Calculation of Capillary Isoelectric Point; Capillary Zone Electrophoresis: Enzyme assay, Analysis of protein folding, Metalloproteins.

BYK 616 Tumor Markers 3+0 7,5
Definition and General Properties of Cancer; Diagnosis and Tumor Markers of Cancer; History of Tumor Markers; General Properties and Classification of Tumor Markers; Oncogenes and Tumor Suppressor Genes in Cancer; Tumor Markers in Breast Cancer; Over Cancer; Tumor Markers of Colorectal Cancer; Prostate Cancer; Lung Cancer; Cancer

Cells as Circulating Tumor Markers; Tumor Markers in Treatment; New Approaches in Biomarker Discovery; Tumor Markers Measurement Methods.

BYK 618 Biochemistry of Aging 3+0 7,5
Process of Aging; Biochemical and Pathophysiologic Changes Associated With Aging; Aging Theories; Theory of Genetic Coding; Theory of DNA Damage; Theory of Mitochondria; Glycosylation; Free Radical Theory; Telemore Theory; Immun Theories; Endocrine Theories; Neuro-Endocrine Theory; Calori Restriction Theory; Somatic Mutation Theory.

BYK 890 Thesis 0+1 30,0

BYK 890-0 Thesis (Thesis Proposal) 0+1 30,0

DKT 505 Research Methods in Speech and Language Therapy 3+0 5,0
Research methods used in speech and language sciences and language acquisition studies; descriptive, relational, causative and experimental research methods; prevalent statistical techniques (eg: t-test, chi-square, correlation, variance analysis, multiple-regression, etc); computerized statistical analysis; single-subject research: AB, ABA, multiple baseline, multiple probe, recursive application models; qualitative research: gathering and analyzing qualitative data; case studies.

DKT 530 Speech Therapy for the Hearing Impaired 2+1 5,0
Augmentative speech therapy methods and techniques for the education of the hearing impaired; therapy techniques directed to improve auditory discrimination; therapy techniques directed to advance articulation skills; therapy techniques directed to advance lip reading skills; therapy techniques directed to improve the functional and prosodic features of the speech of the hearing impaired.

DKT 532 Alternative Communication Methods and Technologies 2+0 4,0
Instruments and methods used to meet the needs of people with speech and language disorders (signs and other symbol systems); introduction of the technology and the devices/equipments these methods utilize (from the smallest handmade instrument to the devices that produce speech by making use of the computers); practice in speech and language lab.

DKT 533 Family Therapy and Consultation in Speech and Language Disorders 2+0 3,0
Definition and concept of advisory and supportive services; advising the families and the teachers of the communicatively disabled: Family education/training; effective advisory skills in special education and speech-language therapy; discussions to solve the frequent problems encountered in advisory processes, and advisory approaches.

DKT 534 Functional Communication Training 2+0 4,0
Definition of functional communication training; functional communication training fields; improving the existing communication functions and teaching new functions to the individuals; functional communication training in reducing the problem behaviors; guidelines in teaching functional communication skills; environmental assessment; identifying the communication functions and skills of the individuals; techniques used in learning new communication functions.

DKT 538 Childhood Language Disorders: Therapy Approaches 3+0 4,0
Language Development in Children; Theories and Approaches of Language Development And Therapy, Studies and Implications in different approaches and their comparision. Childhood Language Disorders; Definitions and Characteristics.Assessment and Diagnosis Measures. Therapy Approaches; Child-Centered Therapy Approaches, Therapist-Centered Therapy Approaches, Sabotage Strategies.

DKT 541 Term Project 3+0 15,0

DKT 542 Clinical Phonology 3+0 4,0
The importance of phonology in speech and language therapy; phonological theories and their clinical application; theory of distinguishing characteristics; theory of natural phonology; language universals; new theories; the use of phonological processes in clinical assessments; methods of phonological transcription; phonological development of normal and disordered children; phonological disorders; collection of phonological data among children and the phonetic inventory; analyses of phonological processes.

DKT 543 Applied Clinical Studies and Seminar I 0+5 2,0
Clinical observations and studies under the supervision of an instructor; data collection for the assessment of cases; analysis of the data; development of therapeutic materials; development and implementation of therapeutic plans.

DKT 544 Applied Clinical Studies and Seminar II 0+5 2,0
Clinical observations and studies under the supervision of an instructor; data collection for the assessment of cases; analysis of the data; development of therapeutic materials; development and implementation of therapeutic plans.

DKT 545 Applied Clinical Studies and Seminar III 0+5 2,0
Clinical observations and studies under the supervision of an instructor; assessment of cases; differential diagnosis; holding therapy sessions; evaluating the progress of the

patient; case discussion, including the therapy plan; keeping the patient record.

DKT 546 Applied Clinical Studies and Seminar IV 0+5 2,0

Clinical observations and studies under the supervision of an instructor; assessment of cases; differential diagnosis; holding therapy sessions; evaluating the progress of the patient; case discussion, including the therapy plan; keeping the patient record.

DKT 547 Introduction to Speech and Language Disorders 3+0 4,0

An overview of the profession of speech and language therapy; history of the profession; job description of a speech and language therapist; the causes, types, characteristics and classification of communication, language and speech disorders in terms of clinical and educational criteria; speech disorders: language disorders, articulatory and phonological disorders, stuttering, hearing impairment, voice disorders, neurogenic communication disorders.

DKT 548 Phonetics and Acoustics of Hearing and Speech 3+0 4,0

Acoustic Features of Hearing ad Speech: Physics of voice, Sound waves, Frequency, Loudness, Period, Volume, Pitch and Intensity; Phonetics: Related concepts; Speech sounds, Phonetic transcription techniques; IPA; Phonetic Inventory of Turkish; Articulatory Phonetics; Auditory Phonetics.

DKT 549 Articulatory and Phonological Disorders 3+0 5,0

The Classification of Articulatory and Phonological Disorders; Their Causes: Mental retardation, Hearing loss, Articulation and facial anomalies in cleft palate and lip, Syndrome-related disorders; Velopharyngeal Insufficiency and Evaluation Processes; Various Tests Used in Assessment; Therapy Methods; Oral-motor Therapy Techniques; Articulatory and Phonological Therapy Methods: Traditional, sensory-motor, cycling, and minimal pair approaches.

DKT 550 Anatomical, Physiological and Neurological Basics of Speech and Language 3+0 4,0

Anatomical, Physiological, Neurological and Neuro-anatomical Basics of Speech and Language: Central and peripheral nervous system (brain and the peripheral organs etc.); Speech and Language Functions from localization and Holistic Approaches; Functional Asymmetry; Neuroplasticity; A Neurolinguistic Approach to Speech and Language Disorders; Radiological Imaging.

DKT 551 Developmental Language Disorders 3+0 4,0

Developmental Language Problems in Toddlers, Preschoolers, and Children at School Age: Classification and diagnosis (developmental delay, autism, developmental dysphasia, specific language problems such as writing and reading, mental retardation, sensory and cognitive disabilities such as hearing loss; emotional and behavioral disorders, childhood schizophrenia, and mutism); Evaluation in Terms of Phonology, Syntax, and Pragmatics; Various Therapy Methods.

DKT 553 Verbal Fluency Disorders 3+0 5,0

Causes, Types, and Evaluation of Disfluent Speech: Stuttering, Biological and physiological causes of stuttering, Speaking fast, Developmental stuttering, Acquired stutterin, Early stuttering; Therapeutic Approaches and Techniques; Use of Technology in Early and Adult Stuttering.

DKT 554 An Overview of Audiology 3+0 4,0

Audiology; Job Description of of an Audiologist; Hearing Loss; Degrees of Hearing; Audiological Tests; Hearing Aids; The Impact of Hearing Loss on Language Acquisition.

DKT 555 Acquired Language Disorders 3+0 5,0

Aphasia: Its definition and terminology, Loss of the ability to produce or comprehend language, Loss of the ability to read and write; Types of aphasia; Clinical and linguistic classification; Assessment of language models; Standard language tests; Adaptation of standard tests to Turkish, Adaptation problems; Therapy models; Therapy plans and their application; Causes and assessment of language disorders subsequent to right hemisphere damage.

DKT 556 Psycholinguistics: Language Development and Delayed Speech 3+0 4,0

Language development in normal children; Language development phases in toddlers, preschoolers and children at school age; Development of phonology, syntax, semantics, and pragmatics; Comparison of language development of disabled children with that of normal children; Case studies regarding language development; Language development in Turkish children and cross-linguistic comparisons.

DKT 557 Motor Speech Disorders 3+0 4,0

Definition, classification, types and causes of motor speech disorders: Dysarthria, Apraxia, Developmental dyspraxia; Upper and lower motor neuron disorders; Pyramidal, extra-pyramidal and cerebellar system disorders; Problems in the motor planning of speech; Assessment, Differential diagnosis, Therapy methods, and Practice.

DKT 558 Clinical Neurolinguistics 3+0 4,0

Application of linguistics in speech and language therapy; Fields of study; Clinical use of phonetics, semantics, morphology, and syntax; Perception of speech and language, Speech chain and cognitive processes; Psychological and neurological features of speech and language; Relation of brain to language and speech; Neurolinguistic theories.

DKT 559 Speech Pathology and Linguistics 3+0 4,0
Linguistics and Its Subfields (phonology, semantics, syntax); Characteristics of the Turkish Language

DKT 561 Ear, Nose and Throat Disorders and Jaw and Face Anomalies 2+0 3,0
The structure, anatomy and physiology of the ear, role and function of the ear in hearing. Mouth and dentition, head, neck and bone structures, ear, nose and throat disorders that impair communication, language and speech. Outer ear diseases, middle ear and inner ear diseases. Information on Otolaryngology; Lip and palate orthodontics, Jaw and face anomalies, clinical observation on cases.

DKT 562 Child and Adult Audiology 3+0 4,0
Causes of Hearing Loss in Adults and Children; Tests Used in Audiological Diagnosis of the New-born and Toddlers: Speech audiometry, Acoustic impedance; Audiometer, Amplification systems; Electro-acoustic Measurements; Auditory Brainstem Audiometry; Masking; Measurement of Autoacoustical Emission; Scanning Hearing Impaired Children and Adults.

DKT 563 Developing Therapy Plan and Psychometrics: Observation 1 0+5 2,0
Observation of the cases with speech and language disorders, collecting information for the evaluation of language delay cases, learning how to use, apply and develop the tests used for evaluating and analyzing data, preparing individualized therapy plans, developing materials appropriate for speech and language disorder of the case observed, applications under the supervision of an instructor, developing observation forms to assess the effectiveness of a therapy. Professional practice rules (gathering background information about the individual, writing reports, interview techniques, etc). Contemporary approaches to early evaluation, educational systems and the processes of programme development.

DKT 565 Music and Sound for Speech and Language Pathologist 2+0 2,0
Music, sound and brain: Mechanisms of human voice production, basics of respiration, nature of respiration, regular and irregular respiration for voice, proper respiration techniques. The proper use of voice and respiration, applications. General information about mechanisms of phonation; vocal folds and their properties, resonation and basic concepts of resonation, resonator structures, sound effects. Professional sound, behaviors and factors that have negative effects on voice; vocal abuse and misuse, ways of protection (muniment), applications of voice use.

DKT 566 Speech Science 3+0 3,0
Comprehension and production of speech; Speech mechanism; Speech organs, and anatomical structures; Experimental phonetics; Physiological phonetics; Applied computerized speech laboratory (CSL) and Voiscope studies on "Phonetics and Acoustics of Speech and Hearing".

DKT 567 Eloquence and Diction in Speech and Language Therapy 2+0 2,0
Exercises on duration, stress, pronunciation, intonation and emotion, using the Turkish language appropriately. Critical thinking. Planning of a speech and preparation stage: Defining the objectives, collecting data, designing a plan; components of a presentation: professional listeners, subject, environment and assistive tools, mutual communication, mimics and gestures, clothing, posture, voice use, negotiation, persuading and impressing, listening skills; impressive and eloquent speaking skills: building trust, starting enthusiastically, preparing in advance what you are going to say, starting the conversation, conditions of a persuasive speech, responsibilities of a persuasive speech and practices.

DKT 568 Development of Verbal Language in the Hearing Impaired 3+0 4,0
Language development in the hearing impaired children; Comparison of language development between hearing impaired and normal children; Educational approaches to the development of verbal language in the hearing impaired; Natural-auditory-verbal listening method; Improvement of pragmatic skills; Family training; Development of course plans and materials.

DKT 569 Intervention to Cleft Lip and Palate: Surgical, Orthodontic and Therapeutic Techniques 3+0 4,0
Normal and abnormal craniofacial properties: Anatomy and Physiology; Classification of Cleft Lip and Palate; Nutrition Problems of Newborns; Orthodontic Intervention to Cleft Palate; A Multi-Disciplinary Approach to Assessment and Intervention; Language, Cognition, Phonological Development; Resonance Disorders and Velopharyngeal Dysfunction; Procedures of Assessment in Cleft Lip and Palate; Nasometry; Surgical Interventions to Clefts and Velopharyngeal Dysfunction; Psychosocial Aspects of Cleft Lip and Palate; Treatment Procedures: Speech, Resonance, and Velopharyngeal Dysfunction

DKT 572 Single Subject Research Design and Case Studies in Speech and Language Disorders 3+0 4,0
Data collection techniques in single subject research design; Techniques and research models for graphical data analysis; Examination of case studies; Development of a reserach proposal.

DKT 573 Communication, Language and Speech Therapy in Autism 3+0 4,0
What is Autism; Signs and Symptoms of Autism; Communication, Language and Speech Characteristics of Individuals with Autism; Evaluation of Communication, Language and Speech Skills in Individuals with Autism; Differential Diagnosis; Clinical and Educational Approaches to Autism; Multidisciplinary Approach; Individualized Therapy Planning; Speech and Language Therapy in Individuals with Autism; Family Education.

DKT 574 Clinical Educational Evaluation and Research on Effectiveness of the Therapy 2+0 5,0

Science, scientific research, scientific practices, basic terms such as effectiveness and efficiency, effectiveness research, article reading, use of sources in speech and language theraphy, data collection in the evaluation of speech and language disorders, data analysis and research methods used in the evaluation of therapy processes. Preparing, presenting and publishing case files.

DKT 577 Applied Clinical Studies I 0+5 2,0

Clinical Observations and Practice in Speech and Language Therapy Under the Supervision of an Instructor; Data Collection for the Assessment of Cases; Analysis and Interpretation of the Collected Data; Reporting and Presenting the Cases of Speech and Language Disorders; Development of Speech and Language Therapeutic Materials; Development and Implementation of Therapeutic Plans.

DKT 578 Linguistic Analysis 2+0 3,0

Collection and Transcription of Language Samples. Digitization and Analysis if Language Samples. Investigation of Language Components. Form (Phonology, Morphophonology, Syntax), content (Semantics), Usage (Pragmatics). The Basics of Linguistic Analysis; Semantic analysis, syntactic analysis, pragmatic analysis. Basic Principles to be Considered in Linguistic Analysis.

DKT 579 Applied Clinical Studies II 0+5 2,0

Clinical Observations and Practice in Speech and Language Therapy Under the Supervision of an Instructor; Data Collection for the Assessment of Cases; Analysis and Interpretation of the Collected Data; Reporting and Presenting the Cases of Speech and Language Disorders; Development of Speech and Language Therapeutic materials; Development and Implementation of Therapeutic Plans.

DKT 580 Applied Behavior Analysis: Observation II 0+5 2,0

Collecting data about the behavior disorders of the cases observed, analyzing the data collected, designing criteria to develop appropriate individualized therapy plan, operational step-by-step definition of target behavior, designing an appropriate individualized therapy plan and developing appropriate materials, applications under the supervision of an instructor and developing observation forms to assess the effectiveness of therapy.

DKT 581 Applied Clinical Studies III 0+5 2,0

Clinical Observations and Practice in Speech and Language Therapy Under the Supervision of an Instructor; Data Collection for the Assessment of Cases; Analysis and Interpretation of the Collected Data; Reporting and Presenting the Cases of Speech and Language Disorders; Development of Speech and Language Therapeutic Materials; Development and Implementation of Therapeutic Plans.

DKT 582 Community (Public) Health, First Aid and Basic Pharmacology 2+0 3,0

Health system in Turkey; Public health information; protection of health and protective health system; social importance of first aid; its targets, its definition; respiration system and to-do list in case of emergency; signs of internal and external bleeding (hemorrhage) and first aid; injuries, fractures, poisoning and to-do list in case of emergency; unconsciousness and first aid; epileptic attacks; to-do list during and after an attack; first aid during cessation of heartbeat; to do heart massage and artificial ventilation at the same time; basic pharmacology for speech and language pathologists; general classification of medicine and information on medicine.

DKT 583 Applied Clinical Studies IV 0+5 2,0

Clinical Observations and Practice in Speech and Language Therapy Under the Supervision of an Instructor; Data Collection for the Assessment of Cases; Analysis and Interpretation of the Collected Data; Reporting and Presenting the Cases of Speech and Language Disorders; Development of Speech and Language Therapeutic materials; Development and Implementation of Therapeutic Plans.

DKT 584 Basic Visualization and Analysis Methods 2+2 5,0

Basic visualization and analysis methods in speech and language therapy, principles of using invasive and non-invasive methods, analysis and interpretation, doctor, family and the patient relations, cooperation with speech and language therapist in diagnosis and assessment processes, technical information on such tools such as videolaryngostroboscopy, endoscopy, nasendoscopy, videofluoroscopy, their use in assessment and therapy, practice with these tools under the control of a doctor and an instructor.

DKT 585 Clinical-Educational Evaluation and Research on Effectiveness of the Therapy 3+0 5,0

Research and Practice in Speech and Language Therapy: Scientific research methods, Designs, Examples; Critical Article Reading: Introduction, Method, Results, Discussion, Conclusions; Evaluation and Analysis of Research Methods Used in Assessment, Data Collection, Data Analysis and Therapy Processes of Speech and Language Disorders in Terms of Scientific Evidence; Effectiveness Research.

DKT 586 Basic Geriatrics 3+0 4,0

Demographic and epidemiologic characteristics of aging; biological processes; physiological, cognitive, nutritive and psychological changes; how to cope with aging; health education and counseling; psychosocial geriatrics: dependency and independency, care, related public institutions and non-governmental organizations; geriatric rehabilitation: rehabilitation principles, medical and social rehabilitation; clinical geriatrics: gastrointestinal and respiratory disorders, cardiovascular diseases, CNS and

neuropsychiatric disorders, muscle-skeleton disorders, oncological problems, poisoning, accidents.

DKT 587 Further Evaluation and Therapy for Childhood Language Disorders 3+0 4,0

Developmental Language Disorders: Definition, Classification, Characteristics, Comparisons, Latest research findings; Assessment and Differential Diagnosis: Importance, Definition; Assessment Tools and Methods in Developmental Language Disorders: Psychometric approach, Descriptive approach; Intervention Methods: Clinician-centered approaches, Child-centered approaches, Family-centered approaches, Hybrid approaches.

DKT 588 Pervasive Developmental Disorders with Neurological Basis 3+0 4,0

Basics of Child Neurology; Child Health: Prenatal, natal and postnatal development; Anatomy of the Nervous System: Pyramidal and extrapyramidal systems, Cerebellar system, reflex; Mental Health in Children; Symptoms of Common Psychological Disorders That Impair Communication in Childhood: Autism, Childhood schizophrenia, Mutism; Cooperation Between Physicians and Speech-language therapists in the Diagnosis and Assessment of Disorders.

DKT 589 Differential Assessment in Early Childhood 3+0 4,0

Developmental Speech and Language Problems in Toddlers and Preschoolers; Speech and Language Delay; Developmental Delay; Autism Spectrum Disorder; Specific Language Impairment; Mental Retardation; Sensory and Cognitive Disabilities; Emotional and Behavioral Disorders: Childhood schizophrenia, and mutism; Childhood Fluency Disorders; Speech Sound Disorders; Classification of Developmental Speech and Language Disorders; Differential Diagnosis; Assessment and Therapy Methods; Awareness; Parental Consultations.

DKT 590 Swallowing Disorders 2+1 5,0

Anatomy, Physiology and Neurology of Normal Swallowing; Relations among Voice, Swallowing and Speech Functions; Swallowing Disorders: Neurogenic, mechanical, structural swallowing disorders; Characteristics of Dysphagic Population in Acute and Intensive Care Settings; Evaluation and Diagnosis of Feeding and Swallowing Disorders in Adults: Bedside protocol and assessment, Radiological screening, Videoflouroscopic evaluationö Fiberendoscopic evaluation; Report Writing and Individualized Therapy Planning; Therapy Methods for Swallowing Disorders.

DKT 591 Research on Fluency Disorders 3+0 5,0

Fluency Disorders: Causes, types, and evaluation; Etiologies of Fluency Disorders: Theories regarding etiology of stuttering, Developmental stuttering in children, Cluttering, Psychogenic stuttering, Neurogenic stuttering; Assessment Protocols: Perceptual and instrumental assessment protocols; Treatment Approaches and Techniques: Indirect and direct treatment protocols for preschool, Treatment protocols for school-age children, adolescents and adults who stutter; Technologies Used in Stuttering Treatment.

DKT 592 Voice Disorders 3+0 5,0

Normal Voice, Structures and Production; Respiration, Larynx and Phonation; Resonance; Types of Voice Disorders; Perceptive and Acoustic Features; Causes of Voice Disorders: Functional, neurological and organic voice disorders; Clinical Assessment and Instrumental Functional Diagnosis; Prevention, Assessment Processes of Voice Disorders in Adults; Report Writing and Individualized Therapy Planning; Therapy Approaches with Different Goals for Different Pathologic Symptoms.

DKT 593 Neurogenic Communication Disorders:TBI and Right-Brain Damage 3+0 5,0

Cognitive Communication Disorders; Sub-Clinical Aphasia: Anatomy, Causes, Definition, Terminology, Special diagnostic procedures (Medical/Speech pathology), Assessments for measuring speech, language and cognitive skills; Therapy for TBI in Children; Cognitive Therapy Models; Therapy Plans and Their Use; Right Hemisphere Damage: Apragmatic aphasia, Its causes, Definition, Terminology, Differential diagnosis of aphasia and apragmatic aphasia; Assessment of Related Communicative Cognitive Impairments; Assessment and Therapy.

DKT 594 Assessment and Therapy in Pediatric Feeding-Swallowing Disorders 2+2 5,0

Physiology, Neurology and Development of Swallowing in Newborn, Infants and Children, Differences Between Infants, Children and Adults; Swallowing Problems in Infant and Children; Behavioral Feeding Disorders; Evaluation of Pediatric Feeding and Swallowing Disorders; Report Writing; Planning Individualized Therapy Program; Management of Pediatric Feeding and Swallowing Disorders: Principles of Therapy, Nutritional Approaches in Pediatric Feeding and Swallowing Disorders; Feeding Suggestions; Family Education.

DKT 595 Motor Speech Disorders Research 3+0 4,0

Definition, Classification, Types and Causes of Motor Speech Disorders: Dysarthria, Apraxia, Developmental dyspraxia; Upper and lower motor neuron disorders, Pyramidal, Extra-pyramidal and cerebellar system disorders; Problems in the Motor Planning of Speech; Assessment, Differential Diagnosis, Therapy Methods in Motor Speech Disorders; Evaluation of Studies on Motor Speech Disorders.

DKT 596 Assessment and Therapy in Pediatric Voice Disorders 2+2 5,0

Voice Problems in Childhood; Causes of Voice Problems; Organic causes of voice problems, Vocal abuse and vocal misuse problems, Functional voice problems; Voice Examinations: ENT examination, SLP examination; Report Writing; Planning Individualized Therapy Program; Prevention of Voice Disorders; Vocal Hygiene Practices;

Voice Therapy Approaches; Voice Problems of Children with Hearing Impairment and Voice Therapy; Voice Therapy for Resonance Problems.

DKT 597 Language Studies in Hearing Impaired 3+0 4,0

Course of Language Development in Hearing Impaired Children: Nature of hearing loss and implications for language development; Importance of Early Diagnosis and Intervention in Hearing Impaired Children; Hearing Assistive Devices; Natural Auditory-Verbal Approach; Importance of Family Involvement in Hearing Impairment Treatment; Family Education; Speech and Language Therapy; Inclusion in Hearing Impaired Children.

DKT 598 Assessment and Intervention of Craniofacial Abnormalities 3+0 4,0

Normal and Abnormal Craniofacial Properties: Anatomy and Physiology; Classification of Cleft Lip and Palate; Feeding Problems in Newborns; Orthodontic Intervention to Cleft Palate; A Multi-Disciplinary Approach to Assessment and Intervention; Language, Cognition, Phonological Development; Resonance Disorders and Velopharyngeal Dysfunction; Procedures of Assessment in Cleft Lip and Palate; Nasometry; Surgical Interventions to Clefts and Velopharyngeal Dysfunction; Psychosocial Aspects of Cleft Lip and Palate; Treatment Procedures: Speech, resonance, and velopharyngeal dysfunction.

DKT 599 Rehabilitation of Voice Disorders 3+0 5,0

Concept of Normal Voice; Voice Disorders: Functional voice disorders, Organic voice disorders, Neurological voice disorders; Guidelines for Voice Therapy: Goals of voice therapy, Voice therapy techniques; Voice Therapy in the Changes in Laryngeal Structure; Voice Therapy in Voice Misuse and Abuse; Voice Therapy in Neurological Problems: Voice therapy in dysarthria, Voice therapy in apraxia, Voice therapy in cerebral palsy, Voice therapy in Parkinson's disease; Rehabilitation of Laryngeal Cancer; Voice Therapy for Special Problems: Transsexual voice, Voice problems due to endocrine disorders or hormone imbalance.

DKT 601 Research Methods in Speech and Language Therapy 3+0 7,5

In this course, research studies designed with Bio-statistic and single subject research designs are carried out by applying computer package programs.

DKT 602 Analysis of Research in Speech and Language Therapy 3+0 7,5

After reviewing the literature in Speech and Language Therapy, selected articles will be analyzed extensively. Theoretical bases of the study, method section, and consideration of ethical issues in the study will be evaluated and discussed.

DKT 608 Therapy Approaches to/for Neuro-Motor Speech Disorders 3+0 7,5

Topics regarding advanced methods in diagnosis and therapy of the Dysarthrias and Apraxia, imaging methods, and team approach are studied. Applied studies are carried out.

DKT 611 Geriatric Communication Disorders 3+0 7,5

Topics regarding communication disorders observed with old people, cortical dementia (Alzheimer, Pick's), Sub-cortical dementia (Parkinson, Huntington), distinctive diagnostic and therapeutic methods of communication disorders observed with old psychiatric patients, the role of speech and language pathologist, and team approach are studied. Applied studies are carried out.

DKT 615 Speech Therapy for Children and Adults with Hearing Impairment and Cochlear Implants 3+0 7,5

Before and after the surgery, assessment/evaluation and therapeutic approaches of speech of patients with Cochlear Implants and team approach are studied. Applied studies are carried out.

DKT 617 Genetics Research in Speech and Language Disorders 3+0 7,5

In this course, in cooperation with genetic science, the role of genetics in speech and language disorders will be explored by conducting advanced research projects.

DKT 618 Language-Brain Research 3+0 7,5

In this course, in cooperation with neurology, the relationship between language and brain will be explored by reviewing recent articles and conducting advanced research projects.

DKT 619 Research in Linguistics 3+0 7,5

Deals with general linguistics, phonology, morphology, syntax and pragmatics.

DKT 620 Speech Fluency Research and Theories 3+0 7,5

Theories and approaches attempting to explain the etiology of fluency disorders in adults and children are elaborated; applied studies are held.

DKT 621 Current Practice Regarding Language Disorders in the Infants and Toddlers 3+0 7,5

The neurology and etiology of speech and language disorders in the infants and toddlers are elaborated through clinical and educational approaches; applied studies are carried out.

DKT 623 Speech Therapy and Rehabilitation in the Laryngectomees 3+0 7,5

Rehabilitation of patients who have undergone operation due to throat cancer and speech therapy techniques for post operation. Management of and hygienic issues in the Laryngectomees. Family training for the relatives of the

Laryngectomees. Trachea-esophageal speech prostheses. Speaking through electro-larynx. Esophageal speech.

DKT 624 Technological Research in Speech Science 3+0 7,5

Research are conducted to advance the software and devices used for speech therapy.

DKT 625 Eperimental Phonetics: Advanced Studies 3+0 7,5

Discussion of contemporary topics in the speech and hearing sciences; advanced studies in acoustics, physiological and perceptual phonetics; experimental phonetics analysis and applied studies in Turkish phonetics. Studies in articulatory phonetics: vocal organs, parametric phonetics, instrumentation etc., acoustic phonetics: spectrograph, acoustic characteristics of speech sounds, etc. and auditory phonetics: perceptual units of speech, DAF, psychoacoustics experiments, etc.; Acoustic characteristics of disordered speech.

DKT 627 Central Auditory Processing Disorders 3+0 7,5

Central Auditory nervous system patalogies, advanced audilogical assessment techniques, assessment: CAP test battery and rehabilitation practicum. Concepts and practices relevant to assessment and management of central auditory processing disorders and attention deficit. Assessment and therapy program implications in cases who have Central Auditory nervous system patalogies.

DKT 628 Special Topics and Contemporary Professional Issues in Speech and Language Therapy 3+0 7,5

Discussion of contemporary Professional issues; specific topics in multicultural and multilingual aspects in language acquisition and disorders and its implications for speech and language therapy profession: cleft lip and palate, stuttering and cluttering, voice disorders, aphasia and other neurological based language disorders, articulation and phonological disordes, swallowing disorders, etc.

DKT 630 Phoniatrics 3+0 7,5

Advanced Phonation and laryngeal physiology; Clinical measurements of speech, language and voice. Professional voice including singing; Advanced study of vocal and respiratory mechanisma with new techonology using videolarengo stroboscopy, nasopharyngoscopy etc.; assessment and remediation in voice and swallowing disorders. Actual Clinical studies in phoniatrics and relevant disorders.

DKT 635 Language and Speech Therapy Clinical Practicum I 2+2 7,5

Use of Contemporary Assessment and Therapy Methods in Speech and Language; Use of Research for Assessment Development; Development of Checklists, Assessment Instruments, Test Kits and Therapy Materials in Turkish; Use of Appropriate Technology; Use of Imaging Techniques; Development of Alternative Supportive Communication Systems in Turkish.

DKT 636 Language and Speech Therapy Clinical Practicum II 2+2 7,5

Use of Contemporary Assessment and Therapy Methods in Speech and Language; Use of Research for Assessment Development; Development of Checklists, Assessment Instruments, Test Kits and Therapy Materials in Turkish; Use of Appropriate Technology; Use of Imaging Techniques; Development of Alternative Supportive Communication Systems in Turkish.

DKT 637 Language and Speech Therapy Clinical Practicum III 2+2 7,5

Use of Contemporary Assessment and Therapy Methods in Speech and Language; Use of Research for Assessment Development; Development of Checklists, Assessment Instruments, Test Kits and Therapy Materials in Turkish; Use of Appropriate Technology; Use of Imaging Techniques; Development of Alternative Supportive Communication Systems in Turkish.

DKT 638 Language and Speech Therapy Clinical Practicum IV 2+2 7,5

Use of Contemporary Assessment and Therapy Methods in Speech and Language; Use of Research for Assessment Development; Development of Checklists, Assessment Instruments, Test Kits and Therapy Materials in Turkish; Use of Appropriate Technology; Use of Imaging Techniques; Development of Alternative Supportive Communication Systems in Turkish.

DKT 640 Aphasia and Contemporary Therapy 3+0 7,5

Various contemporary approaches to language therapy of aphasian and right brain damaged patients with respect to acquired language disorders; principles and applications; functional communication; social and psychosocial models; technological improvements, computer-aided therapy approaches; cognitive neuropsychologic evaluation and therapy in aphasia, psycholinguistic evaluation and therapy techniques in aphasia, applied studies. Advantages and disadvantages of approaches.

DKT 642 Evidence-Based Practice in Speech and Language Pathology 3+0 7,5

Data collection techniques in single subject research design, techniques for graphical data analysis, and research models in speech and language disorders; In terms of Case Studies; randomized control designs, evidence-based practice research examples are examined, research proposal is prepared and applied studies are conducted.

DKT 644 Specific Language Impairment (SLI) 3+0 7,5

Definition and Characteristics of Specific Language Impairment (SLI); Diagnosis of SLI; Cross-linguistic Comparisons of SLI; SLI in Turkish-Speaking Children; SLI in Preschool Children; SLI in School Children and Adolescents; Social, Emotional and Cognitive Development of Children with SLI; SLI and Learning Disability;

Assessment of SLI in Children; Intervention Methods for Children with SLI; Resarch on SLI.

DKT 648 Clinical Research in Pediatric Swallowing and Voice Disorders 3+3 7,5

Physiology, Neurology and Development of Swallowing and Voice Disorders in Infants and Children; Swallowing and Voice Problems in Infant and Children; Behavioral Feeding Disorders; Evaluation of Pediatric Feeding, Swallowing and Voice Disorders; Videofluoroscopy of Swallowing in Pediatric Patients; Other Diagnostic Tests Used for Evaluation of Swallowing and Voice Disorders; Management of Pediatric Feeding, Swallowing and Voice Disorders: Principles of therapy, Family education; Surgical Approaches to Diagnosis and Management in Pediatric Voice and Swallowing Disorders; Planning and Conducting Research with Multidisciplinary Teams.

DKT 650 Clinical Research in Swallowing Disorders 3+3 7,5

Analysis and Synthesis of Evidence-Based Practice Research; Role of Endoscopy in Evaluation and Treatment of Swallowing; Endoscopic Perspective of Normal Swallowing; Endoscopic Procedures to Evaluate Oropharyngeal Swallowing; Safety in Endoscopic Swallowing Evaluations; Use of Endoscopy in Treatment and Management of Dysphagia; Use of FEES/FEESST to Asses and Manage Patients with Swallowing Disorders; Assessment and Management of Patients with Head and Neck Cancer and Tracheotomy; Planning and Conducting Research in Clinical Swallowing Disorders.

DKT 651 Evidence-Based Practices in Cleft Lip-Palate-Craniofacial Anomalies 3+0 7,5

Relationship of Cleft Anatomy and Speech; Speech Problems of Children and Adults with Cleft Lip and Palate; Indirect Therapy Methods for Children at the Age of 0-3; Instrumental Speech Analysis: Nasendoscopic assessment, Nasometry, Ultrasound assessment, Intra-oral pressure measurements, Electropalatography, Acoustic analysis; Use of Instrumental Speech Measurements in Therapies.

DKT 652 Clinical Research in Voice Disorders 3+3 7,5

Analysis and Synthesis of Evidence-Based Practice Research; Perceptual Assessment of Voice; Voice Handicap Index; GRBAS; Non-Instrumental Evaluation: Maximum phonation time, S/z ratio; Instrumental Evaluation: Laryngoscopic examination, Fiber-optic laryngoscopy, Videolaryngostroboscopy; Acoustic Analysis: CSL (Computerized Speech Lab), Praat; Aerodynamic Evaluation: PAS (Phonatory Aerodynamic System); Clinical Voice Therapy; Planning and Conducting Research in Clinical Voice Disorders.

DKT 653 Current Approaches in Traumatic Brain Injury and the Right Brain Damage 3+0 7,5

Causes, Indications and Symptoms of Traumatic Brain Injury; Language and Language-Related Characteristics After Right Brain Damage; Assessment, Diagnosis and Therapy Approaches; Diagnosis, Assessment and Therapy Methods of Traumatic Brain Injury; Presentation and Application of Current Test Materials; Applications on Adults; Current Research and Rhetorical Issues on Traumatic Brain Injury and Right Brain Damage.

DKT 654 Seminar 3+0 7,5

DKT 655 Single Subject Designs in Speech and Language Therapy 3+0 7,5

An Overview of History of Single-Subject Design; Single-Subject Research and Basic Concepts; Applied Behavior Analysis; Methods of Behavioral Recording; Reliability; Validity; The A-B Designs; Multiple-Baseline Designs; Multiple-Probe Designs; Changing Criterion Designs; Alternating Treatments Designs; A-B-C Designs; Alternating Conditions Designs; Parallel Treatments Designs; Social Validity; Graphics and Graphical Analysis; Writing Research Proposal and Report; Presenting and Publishing Research Results; Ethical Responsibility.

DKT 656 Current Perspectives on Fluency Disorders 3+0 7,5

An Overview of Contemporary Approaches to Fluency Disorders; Contemporary Approaches and Methods in Fluency Therapies: Preschool children, School age children, Adults; Evidence-Based Practices in Fluency Disorders: Stuttering, Cluttering; Case Analysis: Differential diagnosis and reporting techniques; Review of Research on Fluency Disorders: Stuttering and cluttering research.

DKT 658 Scale Development and Adaptation in Speech and Language Therapy 3+0 7,5

Basic Concepts in Scale Development; Types of Scales; Steps in Scale Development and Adaptation Process; Item and Scale Development Strategies; Test and Item Statistics; Item Analysis; Item Selection; Types and Analysis of Validity and Reliability; Standardization and Normative Studies; Statistical Analysis and Interpretations Used in Scale Development Process; Commonly Used Speech and Language Scales in the World; Speech and Language Scales Developed and Adapted in Turkish; Evaluating Scale Development and Adaptation Studies.

DKT 701 Speech and Language Therapy in Autism Spectrum Disorder 3+0 3,0

Definition of Autism Spectrum Disorder; Types of Autism Spectrum Disorder; An Historical Overview of Autism Spectrum Disorder; Evaluation in Autism Spectrum Disorder; Differential Diagnosis in Autism Spectrum Disorder; Speech, Language and Communication Abilities; Development in Autism Spectrum Disorder; Speech and Language Therapy Methods and Practices in Autism Spectrum Disorder.

DKT 702 Imaging and Analysis of ENT Diseases 2+2 5,0

Basic Imaging Methods in Ear, Nose and Throat Diseases: Invasive techniques and principles of use, Non-invasive techniques and principles of use, Analysis, Interpretation,

Reporting; Collaboration of Ear, Nose and Throat Specialist and Speech and Language Therapist: Evaluation, Diagnosis; Instruments in Ear, Nose and Throat Diseases: Videolaryngostroboscopy, Endoscopy, Nasendoscopy, Videofluoroscopy, High speed imaging, Technical features, Use in assessment, Use in treatment, Use in voice therapy; Practice.

DKT 704 Speech and Language Disorders in Neurodegenerative Diseases 4+0 4,0

The Overview of Neurodegenerative Diseases: A brief overview of functional brain anatomy, The concept of neurodegeneration, Basic pathophysiological features of neurodegenerative disease; Alzheimer's Disease: Etiology, Clinical course, Prognosis; Parkinson's Disease: Etiology, Clinical course, Prognosis; Motor Neuron Disease: Etiology, Clinical course, Prognosis; Other Neurodegenerative Diseases: Clinical features; Communication Disorders in Neurodegenerative Diseases: Causes, Assessment, Classification, Theoretical and practical approaches for understanding therapy framework.

DKT 706 Evidence-Based Practice in Aphasia 3+0 4,0

Basic Concepts About Aphasia: What is aphasia?, Causes of stroke, Types of aphasia; Aphasia Rehabilitation; Aphasia Therapy; Evidence-Based Practices in Aphasia: Language therapy approaches, Individual language therapy for post-stroke aphasia, Group therapy for post-stroke aphasia, Community- based therapy programs, Training of conversation/communication partners, Training of parents and caregivers; Computer-Based Treatment in Aphasia: Tele-Therapy; Music-Based Therapies; Constraint Induced Therapy (CI) for Aphasia; Therapy of Specific Aphasia Deficits.

DKT 708 Speech and Language Therapy in Specific Learning Disability (Dyslexia, Dysgraphia) 3+0 3,0

Definition of Specific Learning Disability; Evaluation and Diagnosis of Specific Learning Disability; Effect of Specific Learning Disability on Language Development; Definition and Types of Dyslexia; Evaluation and Diagnosis of Dyslexia; Effect of Dyslexia on Reading Skills; Definition and Types of Dysgraphia; Evaluation and Diagnosis of Dysgraphia; Effect of Dysgraphia on Writing Skills; Speech and Language Therapy Practices in Specific Learning Disability.

DKT 710 Scale Development 3+0 3,0

Basic Concepts about Scale Development; Theories Used in Scale Development: Classical test theory (IRT), Article response theory (MTC), Maximum likelihood factor analysis, Structural equation modeling; Stages of Scale Development: Determining the structure to be measured, Creating a pool of items, Determining the measurement format, Expert assessment of the initial item pool, Making a pilot test, Conducting item analysis, Reliability testing, Validity testing, Interpretation of scores, Determining the appropriate scale length.

DKT 712 Seminar 3+0 5,0

DKT 790 Thesis 0+1 30,0

DKT 890 Thesis 0+1 30,0

DKT 890-0 Thesis (Thesis Proposal) 0+1 30,0

EDB 501 Academic Writing Skills 3+0 5,0

Origins of Scientific Writing: Types of scientific papers, Manuscripts and thesis; Parts of the Manuscript: Title page, Introduction, Methods, Results, Discussion, Conclusion, Acknowledgement, References; Presentation of the Results Effectively in Different Ways: Tables, Figures; Bibliography: Using EndNote software in the bibliography; Ethics: Rights and permissions, The right to become an author and author ranking; Cover Letter: Cover letter preparation; Other Issues: Use of abbreviations, Submitting the manuscript, Evaluation of manuscript writing.

FBT 501 Plant Morphology 3+0 7,5

Vegetative Organs: External morphology of Stem: Leaf arrangement, Ramification types, Stem; External Morphology of Leaf: Lamina (Leaf venation, Shape of lamina), Petiole, Basis, Heterophylly, Leaf Metamorphosis (Bud scales, Spine-like, Succulent, Tendrillous, Trap, Generative Floral leaves); External Morphology of Root: Root kinds, Root metamorphosis. Generative organs: External Morphology of Flower, Perianth, Stamen, Polen, Pistil, Ovule, Inflorescence (Racemose, Cymose); External Morphology of Fruit: (Simple, agregat, compound fruits); External Morphology of Seed: Seed germination, Seed dispersing.

FBT 502 Flowering Plant Anatomy 3+0 7,5

Internal Morphology of Plant: Cytology: Protoplasm, Ergastic substances; Cell wall: Formation and layer of cell wall, Chemical structure of cell wall, Chemical differantion of cell wall, Submicroscobic structure of cell wall, Cell shape, Cell division; . Histology: Meristem tissues, Mature tissues (Protecting tissue, Parenchyma, Supporting tissue, Conducting tissue, Glandular system). Internal Organography: Vegetative Organs: Inner morphology of stem (Primary structure of stem, Secondary structure of stem), Inner morphology of leaf, Inner morphology of root (Primary structure of root, Secondary structure of root);Generatif Organs: Inner morphology of flower, Inner morphology of fruit, Inner morphology of semen.

FBT 505 Techniques of Plant Preparation 3+0 7,5

Technıque of Microscopy: Principles of Microscope usage; Methods of Preparation Making: Dry close, Scrape, Crush of tissue, Transparenter and determiner materials; Fıxatıon of Specımens and Keep of Materıals: Fixation substances, Fixation liquids, Freeze- Drying, Limpidity and molify;

Taking Water in Specimens; Stains and Staining: Basic and special stains, Stains for special structures, Natural stains, Preparation of some solutions and stains, Methods of staining (Singular, Bilateral, and Trio staining); Mounting Mediums for permament preparation; Taking Sections: Kinds of sections, Drawing picture with microscope, Measuring with microscope.

FBT 506 Seminar 3+0 7,5

FBT 510 Endemic Plants in Turkey 3+0 5,0
Definition of Endemic Plants; Endemic Plants Specific to Turkey; Endemic Richness of Turkey; Importance of Endemic Plants; Endemic Plant Diversity; Importance of Endemic Plants as a Biological Richness; Protection of Environmental and Biological Resourses.

FBT 512 Molecular Methods in Plant Taxonomy 3+0 5,0
Plant nuclear genes, repetitive and one copy genes, multigenes families, special gene regions, organization and evolution of plant mitochondrial genom, molecular organization of plant telomer and centromeres, Polyploidy in plants and importance in plant's world, diploidisation in polipyloidy and evolutionary importance, plant endonucleases, endonucleases dependent zinc and calcium, plant cell division, cytokinesis and genetic organization, gene silencing in transgenic plants, modern methods in plant research (microscobic and molecular technics, molecular systematic studies and remote sensing).

FBT 513 Plant Identification 3+0 7,5
Reasons for Plant Identification, Materials Required for Plant Identification, Methods of Plant Identification, Revision of a Genus, Revision of a Flora, Botanical Nomenclature, Meaning of Taxon, Scientific Names, Typification, Type, Kinds of Types, Priority, Limitation of the principle of priority, Synonyms and Homonyms, Nomenclaturel Synonyms, Taxonomical Synonyms, the use of Authors? names, the use of "in" and "ex", Transfer, Rejection of Names: Nomenclaturel Rejection, Taxonomical Rejection, Some other important rules in the Nomenclatural Code, Publication of Floristic Studies, Useful References in Plant Identification, Taxonomic publications, Diagnostic keys.

FBT 515 Methods for Establishing an Herbarium 3+0 7,5
Herbarium of Flowering Plants, Equipment Required to Collect Plants, Information and Techniques for Plant Collection, Compressing and Drying Plants, Note-taking and Labeling on Excursion, Protection and Preservation of plants, Mounting and poisoning plants, Herbarium of some special groups of plants, Gymnospermae, Crassulaceae, Aizoaceae, Cactaceae, Potamogetonaceae, Najadaceae, Arecaceae, Hydtochoritaceae, Herbarium of Flowerless Plants, Herbarium Cases, Type Specimens. Applied studies.

FBT 516 Harmful Plants 3+0 7,5
Amaryllidaceae: Galanthus, Narcisus; Araceae: Arum; Araliaceae: Hedera; Apocynaceae: Nerium; Buxaceae: Buxus; Cannabinaceae: Cannabis; Caprifoliaceae: Sambucus; Compositae: Tanacetum; Ericaceae: Rhododendron; Euphorbiaceae: Euphorbia, Ricinus; Hippocastanaceae: Aesculus; Leguminosae: Laburnum, Lathyrus; Liliaceae: Colchicum, Veratrum; Papaveraceae: Papaver; Papilionaceae: Vicia; Ranunculaceae: Aconitum, Delphinium, Helleborus; Rosaceae: Prunus; Scrophulariaceae: Digitalis; Solanaceae: Atropa, Datura Hyoscyamus, Solanum, Nicotiana, Mandragora; Umbelliferae: Conium (Their Morphology, Habitats, Active compounds, Harmful parts, Harmful effects).

FBT 517 Introduction of Plant Ecology 3+0 5,0
Fundamental concepts of plant ecology, Autoecology (adaptation of plants), soil, climate, water, wind factors, biological factors, ecological life cycle, plant formations and migration, ecological adaptation and evolution, ecotype, ecofin, ecospecies, applied ecology, conservation ecology, fertility ecology, pollution ecology.

FBT 519 Flora of Turkey: Introduction 3+0 5,0
Geographical divisions, Topography, Climate, Plan of the Flora, Main sources on Turkish flora, Phytogeographical Regions: Euro-Siberian region, Mediterranean region, Irano-Turanian region, Phytogeographical elements, Endemism, General Literature on Turkish Vegetation, Abbreviations, Flora of Turkey Volume 1: Pteridophyta, Equisetales, Lycopodiales, Selaginellales, Filicales, Spermatophyta: Gymnospermae: Pinaceae, Taxaceae, Cupressaceae, Ephedraceae; Angiospermae: Ranunculaceae, Paeoniaceae, Nymphaceae, Berberidaceae, Papaveraceae, Cruciferae (Brassicaceae), Capparaceae, Resedaceae. Cistaceae, Violaceae, Polygalaceae.

FBT 521 Flora of Turkey I 3+0 5,0
Information and Applied Studies on the Families in the Flora of Turkey Volumes 2 and 3: Portulaccaceae, Caryophyllaceae, Illecebraceae, Polygonaceae, Chenopodiaceae, Amaranthaceae, Cynocrambaceae, Aizozceae, Molluginaceae, Phytolaccaceae, Tamaricaceae, Frankeniaceae, Droceraceae, Elatinaceae, Theaceae, Guttiferae (Hypericaceae), Malvaceae, Tiliaceae, Linaceae, Geraniaceae, Oxalidaceae, Balsaminaceae, Zygophyllaceae, Rutaceae, Simaroubaceae, Aceraceae, Staphyleaceae, Meliaceae, Vitaceae (Ampelidaceae), Rhamnaceae, Aquifoliaceae (Ilitaceae), Anacardiaceae, Celastraceae, Leguminosae (Fabaceae).

FBT 522 Flora of Turkey II 3+0 5,0
Information and Applied Studies on the Families in the Flora of Turkey Volumes 4 and 5: Portulaccaceae, Rosaceae, Myrtaceae, Punicaceae, Lythraceae, Onagraceae, Trapaceae, Hippuridaceae, Callitrichaceae, Cucurbitaceae, Datiscaceae, Cactaceae, Crassulaceae, Saxifragaceae, Parnassiaceae, Grossulariaceae, Hamamelidaceae, Umbelliferae (Apiaceae), Araliaceae, Cornaceae,

Caprifoliaceae, Valerianaceae, Morinaceae, Dipsacaceae, Compositae (Asteraceae).

FBT 523 Economic Plants 3+0 7,5
Plants Used as Food (Grains, Vegetables, Fruits and Plants Used for Oil Production); Plants Used as Spice; Narcotic and Stimulant Plants; Industrial Plants (Cellulose, Latex, Essence, Fibers, Tannin, Resin, Balsam, Gum, Honey and Dye Plants); Plants Used for Dyeing in Turkey and the Tropics; Medicinal Plants; Ornamental Plants; Sea and Fresh Water Algea; Mushrooms.

FBT 524 Flora of Turkey III 3+0 5,0
Information and Applied Studies on the Families in the Flora of Turkey Volumes 6 and 7: Portulaccaceae, Lobeliaceae, Campanulaceae, Ericaceae, Lentibulariaceae, Primulaceae, Ebenaceae, Styracaceae, Oleaceae, Apocynaceae, Asclepidiaceae, Meyanthaceae, Gentianaceae, Pedaliaceae, Polemoniaceae, Convolvulaceae, Cuscutaceae, Boraginaceae, Solanaceae, Scrophulariaceae, Orobanchaceae, Acanthaceae, Globulariaceae, Verbenaceae, Labiatae (Lamiaceae), Plumbaginaceae, Plantaginaceae, Thymelaccaceae, Eleagnaceae, Lauraceae, Santalaceae, Loranthaceae, Rafflesiaceae, Aristolochiaceae, Euphorbiaceae, Buxaceae, Empetraceae, Urticaceae, Cannabinaceae, Moraceae, Ulmaceae, Juglandaceae, Platanaceae, Fagaceae, Corylaceae, Betulaceae, Salicaceae, Ceratophyllaceae, Rubiaceae.

FBT 526 Flora of Turkey IV 3+0 5,0
Information and Applied Studies on the Families in the Flora of Turkey Volumes 8 and 9: Portulaccaceae, Butomaceae, Alismataceae, Hyrocharitaceae, Juncaginaceae, Najadaceae, Potamogetonaceae, Ruppiaceae, Zannichelliaceae, Zosteraceae, Cymodoceaceae, Posidoniaceae, Musaceae, Cannaceae, Palmae (Arecaceae), Araceae, Lemnaceae, Liliaceae, Amaryllidaceae, Iridaceae, Orchidaceae, Disocoreaceae, Commelinaceae, Sparganiaceae, Typhaceae, Juncaceae, Cyperaceae, Graminae (Poaceae) and Chromosome numbers of the plants in volume 11.

FBT 537 Medicinal Plants of Anatolia 3+0 5,0
Definition of Medicinal Plants: Short history of plant-mankind interaction; Paleobotanical Findings; Plant Structures; Different Uses of Plants in Anatolia; Structure of Medicinal Plants; Purposes of Medicinal Plants; Related Disciplines; Research Methods; Preliminary research, Definition of aims and goals, Literature survey, Field selection, Field study, Related questions, Plant collection and identification; Medicinal Plants of Anatolia; Local Names of Plants; Active Substances of Plants; Uses of Plants for Other Purposes in Turkey; Plant Conservation; Relationship Between Ethnobotany and Education.

FBT 601 Basic Principles of Plant Systematics 3+0 7,5
Purponse of Plant Systematic; History of Plant Systematic; Terminology of Plant Systematic; Systematic Categories; The Characters used in Systematic: Morphological Characters, Anatomical Characters, Palynological Characters, Embryonic Characters; Cytologic haracters, Phytochemical Characters, Collection of Plant Material; Plant Nomenclature, Publication of Plants.

FBT 602 Phylogenetic Systematic 3+0 7,5
General Defination; Taxon Selection; Character Analysis: Defination, Character relation, Homology evaluation, Character weightiness, Matrix of character step; Cladogram Drawing: Apomorphy, Monophly, Analysis of Parsimony, Polytomi, Polymorphic characters, Consensus tree, Maximum likelihood, Analysis of bayesiyan, Measurement of homoplasies; Analysis of Cladogram: Phylogenetic classification, Character evolution, Biogeograpy and ecology, Ontogenesis and heterocrony; APGIII.

FBT 603 Nomenclature and Using Terms 3+0 7,5
Requirement and History of Plant nomeclature; Principles of nomebclature: Binominal Nomenclature; Categories, Authors, Valid publishing, Publish primacy, Name keeping, Name changing, Synonyms; Types of Nomenclaturel, Symbols, Latin terms and abbreviations; Etymological Explanations and Meaning of Genus and Species name; Pronounciations of names; Mention epitetus; Important subject in terminology: Shape, Surface, Directions, Situation and Definition of Arrengment, Morphological and Anatomical Terms in Plant Identification, Methods of Description of New Species.

FBT 604 Statistical Practices in Pharmaceutical Botany 3+0 7,5
Data Aquisation: Length, wide and height measurements of plant parts; Data Arrengement, Randomly Sampling, Frequency Distributions: Establishing of the frequency Distributions; Histogram, Column and Stripe Graphics; Aritmethic mean, Standard deviation, SPSS: Introduction, Examples, Practices, Graphics.

FBT 605 Plants and Metabolites 3+0 7,5
Anorganic Subtances and Its Plants; Carbonhydrates and Its Plants; Glycosides anad Its Plants; Sapanins and Its Plants; Alcaloids anad Its Plants; Tannins and Its Plnats; Essential Oils and Its Plants; Fixed Oils and Its Plants; Waxes and Its Plants; Oleoresin and Its Plants; Balsams and Its Plants; Resin- Gum Resin and Its Plants; Rubber and Its Plants.

FBT 606 Plant Geography 3+0 5,0
Subject and Sections of Plant Geography; Study Material of Plant Geography; Floristic Plant Geography: Areal Types, Spreading Factors; Historical and Genetic Plant Geography; Ecological Plant Geography; Sociological Plant Geography: Ferest, Meadow, Plant Communitles; Flora Kingdom.

FBT 607 Palynology 3+0 7,5
Pollen Grain Development; General Morphological Structure of Pollen; Terminology of Pollen Morphology; Pollen Types: Simple and Single Pollen, United Pollen; Pollen Size; Homogeneus Pollen; Heterogeneous Pollen; Palynological Techniques; Pollen Preparation for Light

Micoscopy; Pollen Preparation for Scanning Electron Microscopy.

FBT 608 Plant Richness of Turkey, Important Plant Areas and Nature Conservation 3+0 7,5
Nature Plants of Turkey; Rich Habitat Diversity; Different Climates and Geographies of Turkey; Important Plant Areas of Turkey; Site Selection and Determination of borters; Regional Distribution of Important Plant Areas; Conservation Biology and Purpose; Priorities and Initiatives in Nature Conservation; Nature Conservation Contracts.

FBT 609 Plant Identification Techniques 3+0 7,5
What is Plant Identification?; Causes of plant identification; Required tools in plant identification; Plant identification methods; Identification Keys: Use of keys, Synoptic keys, Bracket keys, Dichotom keys, Multi-accsess keys, Difficulties in key using; Using of Flora of Turkey; Plant Identification Practices: Pteridophyta identification, Gymnosperm identification, Woody Dicotyledonae identification, Herbaceus Dicotyledonae identification, Monocotyledone identification.

FBT 610 Plants use in Drug Preparation 3+0 5,0
Plants use in Drug Preparation: Aesculus hippocastanum, Allium sativum, Aloe barbadensis, Anthemis nobilis, Atropa bellodona, Centella asiatica, Crataegus oxycantha, Cynara scolymus, Echinacea purpurea, Equisetum arvense, Hedera helix, Hypericum perforatum, Glycyrrhiza glabra, Malva silvestris, Nigella sativa, Papaver rhoeas, Passiflora incarnata, Pimpinella anisum, Rosa canina, Rosmarinus officinalis, Silybum marianum, Tilia cordata ; Turkish Name; Family Name; Active Ingredients; Indication; Contraindication; Side Effects; Botanical Properties; Distribution.

FBT 611 Medicinal Plant Cultivation 3+0 5,0
Importance of Medicinal Plant Cultivation; Determination of Ecological Request: Abiotic factors, Biotic factors; Generative cultivation: Cultivation with seed, Seed structure, Germination of seed, Break of seed dormancy; Cultivation with spor; Vegetative cultivation: Cultivation with seperation, Cultivation with scion, Cultivation with dipping, Cultivation with stolon, Cultivation with rhizom, Cultivation with tuber, Cultivation with bulb; Breeding of medicinal plants; Cultivation in greenhouse; Plant disease; Medicinal Plants Cultivated in Turkey.

FBT 612 Collecting of Plants and Nature Photography 3+0 7,5
Collection of plant in the field; Necessary materials in collecting; Important techniques and information in collecting; Plant conservation and storage: Databases of Herbarium, input, International databases, Databases in Turkey; Nature Photography: Importance, Purpose; Equipment used in nature photography: lenses, filters, tripod, flash; Nature photography shooting techniques: light, motion, techniq, visual.

FBT 613 Plant Hormones 3+0 5,0
Plant Hormones: Description, Chemical Structures, Functions, Formation and effect mechanisms in the plant cell; Plant Growth Hormones: Auxins, Cytokinins, Gibberellins, Tuberonic acid, Ethilen derivatives, Brassinoids, Salicylates; Plant Stunt Hormones: Ethylen, Abscisic Acid, Jasmonates; Senthetic Hormones: Indol butyric acid, Chlormequat chlorur and daminozid (antigibberellin), Malaic hydrazide, Phosphon, Paclobutrazol; Hormon Usages: Increasing the yield and yield quality, Advence the resistance to diseases and pests; Plant Growth Regulators: Usages of Chemicals in Plant Growth, Usages of Chemicals in Plant Growth Stunt.

FBT 614 Structural Defense Mechanisms in Plants 3+0 5,0
Pathogenesis and Host Response: Pre-existing or Passive Defense Mechanisms: Wax and cuticle, Epidermal layer; Pre-existing Biochemical Defence, Release of anti-microbial compounds; Inhibitors in the Plant Cells; Recognition Factors; Host Receptors and Toxins; Essential Nutrients and Growth Factors; Induced or Active Defense Mechanisms: Pre-existing or Active; Induced Structural Defence: Lignifications, Suberization, Tyloses, Gum deposition; Induced Biochemical Changes: Toxic substances produced, Role of phytoalexins, Role of new protein synthesized; Inactivation of Enzymes and Toxins; Systemic Acquired Resistance; Principle of Induced Resistance.

FBT 615 Cytotaxonomy 3+0 7,5
Situation and importance of Cytologic charcters; Using Some term in Cytotaxonomy; Plant cell and cell structure; Chromosome morphology: Chromosome number; Chromosome behaviors; Polyploidi and taxonomy; Germination of seeds; Taking chromosome materials in root tips; Fixation; Preparation of chromosome sample; Observation mitosis in root tips; Chromosome counting methods; Chromosome dying methods: Feulgen dying technique; Aceto-orsein dying technique; Idiogram creating.

FBT 616 Advanced Plant Anatomy 3+0 5,0
Structure and Origin of Epidermis and Peirdermis; Classification, Sturcture, Place of Stoma in Plant; Classification of Trichomes; Trichome types of Families; Place, Structure and Types of Parenchyme, Place, Structure and Types of Scleranchyme; Place, Missions and Elements of Xylem; Classification of Xylem: Primer Xylem, Seconder Xylem; Place, Missions and Elements of Phloem, Classification of Phloem: Primer phloem, Seconder phloem, Gymospermae wood; Angiospermae wood; Anatomical Investigations of Some Important Medicinal Plants of Monocotyledonae (Amaryllidaceae, Liliaceae, Iridaceae) and Dicotyledonae (Lamiaceae, Apiaceae, Asteraceae, Scrophulariaceae, Solanaceae).

FBT 618 Seminar 3+0 7,5

FBT 790 Thesis 0+1 30,0

FBT 890 Thesis 0+1 30,0

FBT 890- Thesis (Thesis Proposal)
0 0+1 30,0

FKG 501 Extraction of Natural Products 3+0 7,5
History of extraction, extracts used in pharmacy, extraction in pharmacognosic research, mechanical extraction, solid-liquid extraction: important parameters, maceration, infusion, decoction, percolation, continuous extraction (Soxhlet apparatus), extraction with liquifed gasses, distillation; liquid-liquid extraction (counter-current extraction); new techniques: solid phase microextraction (SPME), headspace trapping technique, Likens-Nickerson distillation-extraction technique.

FKG 502 Chromatographic Techniques Used in Seperation of Natural Compounds 3+0 7,5
Definition of chromatograpy, separation mechanisms; adsorption, partition, ion exchange, jel permeation; chromatographic methods: column chromatography: frontal analysis, elution analysis; practice, adsorbants used; gas chromatography equipment, detectors; gas chromatography/mass spectrometry; high pressure liquid chromatography; mechanisms, detectors; flash chromatography; low pressure liquid chromatography; medium pressure liquid chromatography; ion exchange chromatography; jel chromatography; paper chromatography; thin layer chromatography; chromatotron; supercritical fluid chromatography.

FKG 503 Seminar 3+0 7,5

FKG 504 Distillation Techniques used for Natural Materials 3+0 7,5
Definition of distillation; phase equilibrium; distillation phase diagram; mixtures obeying ideal gas law; changes in physical parameters; heat transfer during boiling and condensation; simple distillation; points to be considered before and during distillation; basic structure of distillation unit; fractional distillation; vacuum distillation; steam distillation; azeotropic distillation; molecular distillation; flash distillation; micro-distillation; simultaneous distillation-extraction; dry distillation.

FKG 509 Alkoloid Chemistry 3+0 7,5
General properties, extraction techniques, types; non-heterocyclic, heterocyclic, pyrolizidine, piridine-piperidine, tropane, quinoline, isoquinoline, aporphine, non-lupinan, indol-benzopyrole, imidazole, purine, steroidal, triterpenic, dimeric, quaternary ammonium salts, and bis-alkaloids, reducing reactions: Hofmann, Emde, Von Braun special reactions: Mannich reaction, Michael condensation, aldehyde-amine reactions, phenolic oxidation, lactonization, combined mechanisms; E1 and E2 mechanisms, Mannich, Mono-Mannich and Bis-Mannich bases, Seitzeff rule, piperidonal derivatizations, spectroscopic methods used in structure elucidation.

FKG 515 Spectroscopic Methods used in Structure Elucidation of Natural Compounds 3+0 7,5
Ultraviolet and visible spectrophtometry: ultraviolet absorption, electronic transmission and the effect of conjugation; infrared spectrometry; spectrum taking and evaluation of results; examples: mass spectrometry: basic process, separation by filters; capturing of ions; signal data processes: 1H-NMR spectroscopy: resonance phenomena; chemical shift; spin-spin interaction; interaction among protons; 13C-NMR spectroscopy, Adsorption and resonance, Chemical shift; Chemical shift values in 13C-NMR; two dimensional (2D)-NMR spectroscopy.

FKG 516 Herbal Teas 3+0 7,5
Herbal teas and mixtures. Indications and probable therapies: gall bladder diseases, psychological problems, cold and cough, kidney and bladder diseases, cancer prevention. Herbal products: bag teas, instant teas, spray-dried extracts, tea granules. Tea making: drug and liquid ratio, particle sizes of drugs, extraction method. Storage and packaging of drugs. Tests on plant drugs. Residues on plant drugs. Microbial contamination. Heavy metal contamination. Pesticidal impurities. Radioactive contamination. Herbal teas and related monographs. Legislations on herbal products in the world. Quality control of herbal products. Limit values for drugs. Standardization problems.

FKG 521 Term Project 3+0 15,0

FKG 523 Discovery of Natural Active Ingredients 3+0 7,5
Discovery of Natural Active Ingredients from Plants, Insects, Animals, Microorganisms and Biotechnological Products; Historical Perspective; Natural Products As Templates; Biochemical Diversity; Libraries of Natural Products; New Bioactive Natural Products.

FKG 524 Dietary Supplements and Functional Food of Plant Origin 3+0 7,5
Dietary Supplements of Plant Origin; Description, Overview, Situation in the World; Industrial Plants as Sources of Dietary Supplements; Drug-like Compounds from Edible Plants; Antioxidants; Nutraceuticals; Dietary Supplements; Functional Food; Isoflavons; Phytoestrogens; Probiotics; Prebiotics; Polyunsaturated Fatty Acids; Fermentation Products.

FKG 525 Hallucinogenic and Narcotic Plants 3+0 7,5
Hallucination; Hallucinogenic Plants; Narcotic Plants; Narcotic Compounds; Their Therapeutic Uses; Abuses; Mushrooms; Hemp; Opium; Opium Alkaloids; Tetrahydrocannabinol; Cocaine; Hallucinogenic and Narcotic Plants Used in Pharmaceutical Industry; Their Cultivation, Production and Control.

FKG 526 Screening Techiques for Biological Activities of Medicinal Plants 3+0 7,5

Purpose of screening techniques; Types of screening techniques: Ethnobotanical/Ethnomedical screening, Geographical screening, Biological screening, Phytochemical screening; Phases of biological screening: Types of biological activity screening: Qualitative and quantitative techniques; The strategies for biological activity screening: Broad-based screening (blind screening), Programmed screening, Bioassay-guided fractionation and isolation; High-throughput screening.

FKG 528 Vitamins and Minerals of Plant and Animal Origin 3+0 7,5

General information on vitamins; their classification; water soluble and lipid soluble vitamins of plant and animal origin; extraction methods and analysis of vitamins of plant and animal origin; vitamin-rich plant sources; biological activities; mineral-rich plants sources.

FKG 529 Biotrasformations in Pharmacognosy 3+0 7,5

Biotransformation methods, biocatalysis, biotransformation of natural products and biotransformation applications, industrial-scale applications, biotransformation of natural steroids and terpenoids, biotransformation with plant cell and tissue cultures, aromabiotechnology, fermentation and biotransformation of drugs and herbal extracts.

FKG 530 Phytopharmaceuticals 3+0 7,5

Uses of phytopharmaceuticals in the world, related legislations, situation in Turkey, ESCOP, WHO and Commission E monographs: their botanical nomenclature, classifications, ethnopharmacognostic importance, description of a plant material, its phytochemical composition, uses, preparations, comparison of uses in Turkey, standardizations, summary of previous scientific research.

FKG 531 Complementary Medicinal Products from Natural Sources 3+0 7,5

Plants and active components; plant drug diversity, research on new plant drugs; aromatherapy; principles of aromatherapy; important essential oils and mixtures used in aromatherapy, their preparation and preservation; homoeopathy; principles of homoeopathy, uses of drugs in homoeopathy; homoeopathic pharmacy.

FKG 533 Practical Techniques in Pharmacognosy 2+1 7,5

Important issues in pharmacognosy laboratory; Creation of research and experiment strategy; Properties of glass and other materials; Chemical compounds and solvents; Guidance for usage of equipments and apparatus; Preparation of solvents; Preparation of reactive; Preparation of samples; Planning and application of experimental work; Preparation, drying and storage of plant extracts; Adsorbent compounds used in chromatography and their properties; Important issues in chromatographic and extraction experiments; Record of experimental data in lab-book. Digital record of data; Coding in experimental work; Reproducible experimental work; Issues should be followed in handling reliable results; Preparation of report of experimental work.

FKG 534 Principles of Homeopathy and Drugs used in Homeopathy 3+0 7,5

Definition of Homeopathy; History; Therapy Spectrum; Principles of Effect; Homeopathy Medicines from an Official Perspective: Practices in Germany, Homeopathy pharmacopoeia, Commission D; Points Related to Use and Preparations: Patient table, Pharmacodynamics, Production methods, Dose adjustment and its applications; Fixed-Combination Homeopathic Therapy; Supportive Therapy Systems; Impacts and Effectiveness; Plants Used in Homeopathic Treatment.

FKG 535 Microscopic and Macroscopic Identification of Powdered Vegetable Drugs 3+0 7,5

The Place and the Importance of Powdered Herbal Drugs in European Pharmacopoeia; Structure and the Function of Light Microscope; Preparation of Specimens and the Reagents; Cell Wall and Cell Content; Anatomy of Plant Tissues; Using of the Powdered Drug Identification Key; Properties and the Organoleptic, Macro- and Microscopic Identification of powdered leaf, flower, seed, bark, root, rhizome, tuber and starch drugs.

FKG 536 The High Performance Liquid Chromatography (HPLC) Applications of Herbal Drugs 3+0 7,5

Definition of High Performance Liquid Chromatography (HPLC): Its mechanisms, Stationary and mobile phases, Pump and detectors; Sample HPLC Preparation from Plants; Role of HPLC Methods in Herbal Drug Analysis; Role of HPLC Methods in Nutraceutics and Functional Foods Analysis; Use of HPLC in the Analysis of Primary Metabolites (Carbohydrates, Lipids, Amino acids, Proteins); Use of HPLC in the Analysis of Secondary Metabolites (Polyphenols, Isoprenoids, Alkaloids); Quantitative Analysis-Quality Control Methods.

FKG 537 Herbal Products in Pharmacapoeias 3+0 7,5

Herbal Products and Quality of Herbal Products; Quality Control Methods in the European Pharmacapoeia used for Herbal Products; Pharmacognostic Methods; The Structure of Herbal products in the European Pharmacopoeia; Parts and uses of Herbal Monographs; A sample Herbal Drug Monograph; Herbal products in Turkish Pharmacopoeia; Herbal Products in the Turkish Pharmacopoeia; Herbal Products in World Pharmacopeias.

FKG 538 Industrial Pharmacognosy 3+0 7,5

Types of Herbal Extract; Industrial Production and Standardization of Medicinal and Aromatic Plants; Industrial Production and Standardization of Essential Oils, Fixed Oils and Some Natural Compounds; Research and Development Techniques in Industrial Production of Herbal Products; Facilities and Equipment; Laws and Regulations

on Industrial Production of Natural Medicinal Products in Turkey and Other Countries.

FKG 540 Plant-Source Toxic Compounds 3+0 7,5
Poisoning: Etiology, Causes; Plants Occurring Poisoning: Toxic plants recognition; Plant Skin Effects: Mechanical and chemical irritation, Photosensitisation, Allergic contact dermatitis; Natural Toxic Substances: Alkaloids and essential oils, Toxic amino acids, Coumarins, Furanocoumarins, Cardioactive glycosides, Cyanogenic glycosides, Tannins, Glucosinolates, Plant acids, Phenols, Proteins, Peptides, Saponins, Terpenes; Poisoning With the Use of the Herbal Medicine; Poisonous Plants and Families; Poisonings Symptoms and Treatments of the Important Toxic Plants.

FKG 542 Aromatherapy 3+0 7,5
Definition of Aromatherapy; History of Aromatherapy; Use of Aromatherapy; Characteristics of Essential Oils Used in Aromatherapy; Characteristics of Fixed Oils Used in Aromatherapy; Drugs Used in Aromatherapy: Essential oil drugs, Fixed oil drugs, Drugs of animal origin; Massage in Aromatherapy and the Preparation of Essential Oil Mixtures; Sources, Compositions and Effects of Essential Oils Used in Aromatherapy; Therapeutic Index; Recommended Prescriptions in Aromatherapy; Aromatherapy for Babies and Children; Safety in the Use of Aromatherapy.

FKG 601 Advanced Pharmacognosy I 3+0 10,0
Biological and geographic sources of drugs, drugs derived from marine organisms, animal drugs, tissue cultures as sources of drugs; microorganisms as sources of drugs; factors considered in production of drugs; genetics and production of drugs; plant growth regulators, definition of drugs; chemical factors, physical factors, microbial, insects and other animals.

FKG 602 Advanced Pharmacognosy II 3+0 10,0
Drug trade and control in Turkey and the world, cultivation and control of narcotic drugs, pharmacological activities of plant drugs, general physical, chemical, chromatographic, spestroscopic and other methods, methods used in biogenetic studies, quality control methods of drugs.

FKG 603 Plant Biosynthesis I 3+0 10,0
Basic metabolic processes, primary metabolites (carbonhydrates, fatty acids, etc.), new theories of photosynthesis; sources of secondary metabolites, enzymes, degradation of carbonhydrates, biosythesis of fatty acids, aromatic biosynthesis. Shikimic acid pathway, acetate hypothesis; experimental techniques used in biosynthetic studies; importance of biosynthetic data in pharmacognosy.

FKG 609 Chemotaxonomy 3+0 10,0
Definition carbonhydrates in systematics, changes in phenolics, phenolics and evolution, phenolics and betalaines, distribution and taxonomy of alkaloids, taxonomic evidence based on amino acid distribution, taxonomic value of amino acid studies, taxonomic importance of non-proteinous amino acids; importance of plant oils and waxes in taxonomy.

FKG 610 Preperative Seperation Techniques for Natural Products 3+0 10,0
Introduction to separation techniques, preperative chromatography, distillation and extraction techniques, preparative uses of column chromatography, thin layer chromatography, flash chromatography, medium pressure liquid chromatography, high pressure liquid chromatography, gas chromatography, liquid-liquid extraction, solid phase extraction, fractional distillation, molecular distillation and counter-current distillation.

FKG 611 Analysis and Research Techniques in Phytochemistry 3+0 10,0
Introduction to phytochemistry; definiton of primary and secondary metabolites. Primary metabolites: carbonhydrates, fatty acids, amino acids. Secondary metabolites: Glycosides (phenolics, cyanogenics, flavonoids, antraquinones, antrocyanins, coumarins, cardiotonic saponins); the triterpenic and steroidal compounds: terpens, alkaloids, waxes, resins, balsams. Identification, extraction, isolation, purification, structure elucidation of primary and secondary metabolites.

FKG 612 Antioxidant Activity of Plant Phenolics 3+0 10,0
Oxygen. Reactive oxygen species: free radicals, non-radical species. Oxidative stres. Lipid peroxidation. Antioxidants: in vivo and in vitro antioxidant mechanism, enzymatic antioxidants, non-enzymatic prevention, natural antioxidants and sources, structure-activity relationship. Vitamin E. Vitamin C. Carotenoids. Polyphenols and flavonoids. Natural antioxidants in beverages and plant products. Lipoic acid and glutathione. Melatonin. Selenium. Nitric acid. Diet and antioxidants. Antioxidants on diseases. Measurement of antioxidant activity: measure of free radical scavenging activity, lipid peroxidation, metal chelation effect, chromatographic on-line antioxidant activity methods.

FKG 613 Etnopharmagnosy 3+0 10,0
Definition, history and development of methods in ethnopharmacognosy; medicine systems, regional therapy systems; therapy with plants in Turkey, therapy with plants in Mesopotamia, Egypt, Hittit, Greek, Roman and Byzantine era; therapy with plants in Islamic, Seljuki and Ottoman era, practice in tropical regions, plants used for therapy in Anatolia.

FKG 614 Plant Biosynthesis II 3+0 10,0
Biosythesis of isoprenoids; monoterpenes, sesquiterpenes, diterpenes, sesterterpenes, triterpenes, secondary metabolites biosyntheses via Shikimic acid; organic acids, quinones, coumarins, lignin and lignans, flavonoids, biosynthesis of alkaloids: amino acids, phenyl alanine derivatives, tyrosine derivatives, lysine derivatives, ornitine, triptamine, adenine, guanine and xanthine derivatives.

FKG 615 Mass Spectrometry in Structure Elucidation of Natural Compounds 2+2 10,0

Mass Spectrometry; History of mass spectrometry; resolution in MS; basic processes in MS; separation with filters; trapping of ions, signal data processors; vacuum system; peak types in MS, molecular fragmentation types; fragmentation of fractional groups; qualitative and quantitative applications; uses of combined techniques.

FKG 617 Flavonoids and Biological Activities 3+0 10,0

Flavonoids: Definition, Classification, Chemical structures, Flavonoids Bearing plants, Distribution in the plant kingdom, Biosynthesis, Physicochemical properties, Diagnostic and recogntion reactions, Extraction, Separation and purification methods, Quantitation, Structure determinations, Biological Activities; Flavonoid Drugs and uses in treatment; Izoflavonoids; Neoflavonoids.

FKG 618 Aroma Compounds and Their Analysis 2+2 10,0

Definitions; separation techniques; chromatography: definition, mechanisms, techniques: gas chromatography; detectors; qualitative and quantitative techniques; gas chromatography, dimensional gas chromatography/mass spectrometry; new techniques: headspace: vacuum headspace technique; closed-circuit headspace technique; dynamic headspace analysis; solid phase microextraction (SPME): immersion SPME technique; headspace-SPME technique; Likens-Nickerson, Phytosol, density, refractive index; optical rotation, acid index, ester index; specific analysis: total alcohol percentage, stearopten content.

FKG 619 Terpenes: Chemistry and Biological Activities 2+2 10,0

What are terpenes? Distribution of terpenes in nature and importance for pharmacy; Evaluation of chemical terms of terpenes; Structural properties and classification of terpenes; Enantiomeric properties of terpenes; Separation of enantiomers; Terpenes in plants, animals and food; Last progress in terpene?s chemistry; Methods applied for terpenes analysis; Current knowledge about terpene?s biological activities; Terpenes are important in the field of pharmacy; Terpenes are used in herbal medicines.

FKG 620 NMR Spectroscopy in Structure Elucidation of Natural Compounds 2+2 10,0

Introduction and theory; the equipment and sample preparation; 1H-NMR spectroscopy: resonance phenomenon; chemical shift; spin-spin interaction; interaction among protons; spin systems; shift reagents and double resonance phenomenon; 13C-NMR spectroscopy; absorption and resonance; pulse techniques in NMR spectroscopy; chemical shift values of organic compounds in 13C-NMR; spin-spin interactions; two-dimensional (2D)-NMR spectroscopy.

FKG 621 Animal-Source Drugs and Bioactive Compounds 3+0 10,0

Zootherapy; Bioactive Compounds of Animal Origin; Ethnozoology; Animal Drugs Used in Traditional Medicine; Bioactive Compounds from Ants, Spiders, Ladybugs, Caterpillars and Other Insects; Bioactive Compounds from Snake, Scorpion and Lizard Venoms; Bioactive Compounds from Marine Animals; Bioactive Compounds from Bee: Propolis, Royal jelly and other bee-related natural products; Biological Effects of Hirundinea medicinalis; The Compounds and Products of Animal Origin Used in Cosmetics.

FKG 622 Natural Plant and Animal Materials Used in Cosmetics 3+0 10,0

Aromatic Compounds Used in Cosmetics; Essential Oil Bearing Plants, Obtaining Methods of Essential Oils; Diagnostic and Recogntion Reactions of Essential Oils; Biological Activities of Essential Oils; Odour Classification, Classification of Compounds Used in Cosmetics; Aromatic Compounds Bearing Animal Resources; Cosmetic Regulations; Natural Compounds Bearing Cosmetic Preparation Examples.

FKG 624 Marine Products Pharmacognosy 3+0 10,0

Marine Pharmacognosy: Fauna of Turkey and the World; General Information About Sea Water and Pharmaceutical Usage, Classification of the Organism Used as the Source of Marine Pharmacognosy Research, General Classification of the Secondary Metabolites of Marine Organisms; Unique Chemical Structures of Marine Organisms and Their Sources; Microalgae and Macroalgae; Bioactive Compounds from Coral, Sponge and Other Marine Organisms; Importance of the Marine-derived Compounds in Cancer Research; Various Clinical Stages.

FKG 626 Seminar 3+0 10,0

FKG 790 Thesis 0+1 30,0

FKG 890 Thesis 0+1 30,0

FKG 890-0 Thesis (Thesis Proposal) 0+1 30,0

FKL 502 Neurohumoral Interactions 3+0 7,5

The importance of neurohumoral interactions regarding homeostasis; types of biological interactions; characteristics of autocrine, paracrine and endocrine interactions; Characteristics of neurons; characteristics of synaps and ganglia; neuronal conducation and action potential; types of neurotransmitter, neuromodulator and neurohormones; neurotransmitters in neurohumoral interactions, role of autocoides, hormones, chemokines and other factors; diseases related to the defects in neurohumoral interactions; drugs acting on neurohumoral interactions.

FKL 503 Seminar 3+0 7,5

FKL 504 Endocrine Pharmacology 3+0 7,5
Importance of endocrine system among communicating biological structures; Interactions between nervous system, immune system and endocrine system; definitions of hormone, local hormone and neurohormone; organization of endocrine system and the role of hypothalamus; mechanisms of negative feedback; general characteristics of hormone secreting cells and receptors of hormones; anabolic and catabolic hormones; Hormones of adenohypophysis; ACTH and MSH; Hormones of neurohypophysis, vasopressin and oxytocin, thyroid hormones, hypothyroidism. Hyperthyroidism; parathyroid hormones and calcium homeostasis, hormones of suprarenal gland cortex, cortisone; hormones of pancreas, insulin, glucagon, somatostatin and diabetes mellitus; female sex hormones, FSH, LH, progestins and estrogens; oral contraceptive drugs; male sex hormones, androgens and testosterone; endocrine diseases and related drugs.

FKL 505 Peptidergic Mechanisms 3+0 7,5
Autocoids and neurotransmitters in peptide structure; plasma kinins; angiotensins, neurohormones, oxytocine, vasopressin; synthesis, axonal transportation and secretion of peptides; neuropeptides in central nervous system; colocalization of neuropeptides and with other neurotransmitters in neurons; APUD hypothesis; neuropeptide receptors; opioid peptides; endorphines, enkephalines, dynorphines; opioid receptors; role of peptides in diseases; drug actions by peptidergic mechanisms.

FKL 506 Drug Originated Diseases 3+0 7,5
Disease types and definitions; types of drug toxicities; specific and other toxic effects; permanent effects; allergy and anaphylactic shock; idiosyncratic reactions; mutagenesis; teratogenesis; carcinogenesis; prophylaxis of permanent toxic effects; diseases caused by antibiotics; ototoxicitiy; superinfection; pseudomembranaceus colitis; Gray syndrome; aplastic anemia; fatal agranulocytosis; Reye syndrome; Korsakoff syndrome; neurotoxicity; nephrotoxicity; hepatotoxicity.

FKL 512 Receptors, Signal Transuduction and Drug Action 3+0 7,5
Cell types and their distribution, cell membrane, membrane and action potential, signal transduction in a cell, receptor, ion channel, intracellular second messangers, regulatory mechanisms on intracellular calcium ion, excitation-contraction coupling, differences of excitation-contraction coupling in cell types, drug action mechanisms on signal transduction, agonism, antagonism, actions of drugs on signal transduction, observation of a drug action on signal transduction by a test model.

FKL 516 Application of Molecular Biological Methods in Pharmacology 1+2 7,5
Cell and Tissue Culture Methods in the Evaluation of Drug Effects: cytotoxicity, cell proliferation and apoptotic assays; Isolation and Purification of DNA, RNA, Proteins from Tissue, Blood, Cell Culture with Respect to Drug Effects; Gene Polymorphisms and Drug Effects; PCR, RFLP and Gel Electrophoresis Applications in Pharmacology; Coding of cDNA from RNA, Evaluation of RNA Expression Levels and Applications in Pharmacological Experiments; Use of Interference RNA and Microarray Technologies in Pharmacological Experiments; Antigen-Antibodies Reaction Based Methods in the Evaluation of Drug Effects; Proteomics Expression Methods in Pharmacological Experiments.

FKL 518 Active Transport Mechanisms and Regulatory Proteins 3+0 7,5
Cellular excitability and its properties, Ion pumps; paracellular transport; intracellular ion stores, ionic fluxes during depolarisation, repolarisation and hyperpolarisation; ryanodine receptors; intracellular calcium binding proteins, contraction-relaxation cycle of muscles; actine-myosine proteins, drugs effective in calcium release from intracellular Ca storage, drugs that have effects on intracellular calcium binding proteins, glucose transport system.

FKL 519 Term Project 3+0 15,0

FKL 520 Behavioral Pharmacology 3+0 7,5
Nervous system-behavior relationships; endogenous neurotransmitters affecting behavior; endocrine system-behavior relationships; interaction between stress, pain and behavior; behavioral and psychological experiments on animals; locomotor activity tests, rotarod test, rearing, grooming, hole board; drugs and chemicals influencing animal behavior.

FKL 522 Economy of Drugs 3+0 7,5
Definition of General Concepts Related to Drug Economy: Pharmacoeconomics from the perspective of patients, payment system, manufacturer and distributors and society; Types of Pharmacoeconomic Costs; Costs of Drug Research and Development; Components of Pharmacoeconomics: Humanistic and economic components; Evaluation of Relationships Among Institutions in the Health System; Definition of pharmacoeconomic Problems and Appropriate Solution Methods: Economic Evaluation of Health Services; Evaluation of the Contribution of Rational Drug Use and Pharmacogenetics to Health Economics.

FKL 523 Experimental Pharmacology I 3+0 7,5
Experimental approaches to pharmacology, Pharmacological knowledge and its importance, data hunting and data minig, importance of hypothesis and control groups, sampling in pharmacology, screening techniques in pharmacology, laboratory safety in pharmacology laboratory, introduction to in vivo methods, introduction to in vitro methods, introduction to in silico methods, experimental animals, in vivo manipulation techniques, anesthesia, drug applications, blood sampling methods, experimental applications.

FKL 524 Physiology of Circulation System 3+0 7,5
Unique Characteristics of Cardiac Muscle (structure and function); Pumping Function of Heart; Electrophysiology of Heart; Cardiac Function (Pressure and Volume); Cardiac Cycle; Cardiac Output and Venous Return; Vascular Tree: Structural adaptation of vascular segments and their functions; Hemodynamics; Regulation of Arterial Pressure; Circulation through Special Regions: Cerebral, renal, coronary, splanchnic and skeletal muscle blood flow; Cardiovascular Adjustments in Health and Disease; Student Presentations; Measurement of Blood Pressure Parameters.

FKL 525 Ion Channels Pharmacology 3+0 7,5
Cellular balance between external and internal ions; importance of ion channels in terms of cellular homeostasis; evolutional aspect of ion channels; differences between ion channels and pores; biochemical and physiological properties of ion channels; selectivity of ion channels; functions of ion channels in excitable cells; types of ion channels, Na+, K+, Ca2+ and Cl- channels; sub-types of channels; voltage-dependent Ca channels; receptor-operated calcium channels; ATP-dependent K channels; GABA-benzodiazepine receptor-Cl channel complex; activators and inhibitors of channels; drugs affecting ion channels.

FKL 527 Cancer Pharmacology 3+0 7,5
Basic Properties of a Cancer Cell; Cell Cycles; Checkpoints of a Cell Cycle; Cell Signaling Pathways and Signal Transduction, Growth Factors; Proto-oncogenes; Oncogenes; Tumor Suppressor Genes; Relationship between Telomerase and Cancer; Apoptosis; Role of Cell-Cell and Cell-Matrix Interactions on Metastasis and Angiogenesis; Epidemiology of Cancer and Genetic Factors; Causes of Cancer: chemical carcinogens, viruses and bacteria, oncogenes; DNA Repair Mechanisms; Basics of Cancer Chemotherapy and Antineoplastic Drugs; Classification of Antineoplastic Drugs; Mechanisms of Antineoplastic Drugs; Side Effects of Antineoplastic Drugs; Immunotherapy

FKL 529 Pharmacogenetic 3+0 7,5
Genetic Structure; Structure and Regulation of Genes; Description of Pharmacogenetics; Importance of Pharmacogenetics in Drug Development; Changes in Pharmacokinetics and Pharmacodynamics of Drugs Related to Genetic Factors; Absorption, Distribution, Metabolism and Elimination of Drugs; Pharmacogenomics and Biomarkers; Pharmacogenetics of Drug Metabolism and Receptors and Drug Transporters; Importance of Pharmacogenetics in Clinical Practice; Pharmacogenetics and Gene Expression; Methods, Types and Analysis of Polymorphism; Pharmacogenetics and Proteomics.

FKL 531 Receptor Theories and Experimental Application 3+0 7,5
The concept of receptor and its history; receptor theories; theory of receptor occupancy; theory of biological stimulus; theory of mobile receptor; synthesis and degradation of receptors; variations in cellular receptor densities; relationship between receptors and effectors; structures of receptors; receptor isolation methods; receptor cloning studies; site-directed mutagenesis; dose-effect relationship; calculations of pD2, pA2 and pD'2; application of linear regression for pharmacodynamics.

FKL 533 Pharmacological Basis of Licensing 3+0 7,5
Stages of New Drug Development; Using in vitro and in vivo Research Techniques in Drug Screening: Toxicity assays, Animal assays, Molecular techniques; Clinical Trials: Phase I, II and III studies; Post-Marketing Surveillance: Phase IV: Safety regarding approved indications of licensed drugs, Research on differences of dosage and side effects, Epidemiological studies, Comparison of efficacy of the new drug with other drugs used for the same indication, Providing information about new indications, new routes of administration and studies of new patient groups; Efficacy, Safety and Quality Requirements of Medicinal and Pharmaceutical Products to be Marketed; Duties and Responsibilities of the Pharmacological Evaluation Committee; Evaluation of Drug Applications by Health Authorities; Design of Pharmaco-economic Studies.

FKL 539 Physiology of Nerve and Muscle Cells 3+0 7,5
Morphology of Nerve Cells: Nerve excitation, Action potentials and conduction, All or none law, Saltatory conduction, Ionic basis of excitation and conduction; Nerve Fiber Types and Functions; Glial Cells: Types of glial cells; Excitable Tissue, Muscle: Physiology of skeletal muscle, Contractile responses and molecular basis of contraction; Morphology and Physiology of Cardiac Muscle: Electrical properties of cardiac muscle, Ionic basis of contraction of cardiac muscle, Metabolism of cardiac muscle; Types and Morphology of Smooth Muscle: Molecular basis of contraction; Types of Synapses and Synaptic Conduction: Pre- and postsynaptic potentials, Inhibitory and excitatory synaptic potentials.

FKL 541 Neurodegenerative Diseases 3+0 7,5
Neurodegeneration; Etiopathogenesis of Alzheimer s Disease; Treatment of Alzheimer s Disease; Etiopathogenesis of Parkinson s Disease and Other Movement Disorders; Treatment of Parkinson s Disease and Other Movement Disorders; Etiopathogenesis of Epilepsy Disease; Treatment of Epilepsy Disease; Etiopathogenesis of Neuropathy and Neuropathic Pain; Treatment of Neuropathy and Neuropathic Pain; Disorders of Myelin and Treatment of These Diseases; Ischemic Neuronal Damage; Treatment of Ischemic Neuronal Damage; Lipid Glycoprotein and Mucopolysaccharide Metabolism Related Disorders; Case Studies.

FKL 543 Perinatal and Pediatric Pharmacology 3+0 7,5
Factors Modifying Action of Drugs During Pregnancy; Drug Use in Pregnancy; Risk Assessment of Drugs in Pregnancy and Teratogenicity; Rational Drug Use in Pregnancy; Factors Modifying Action of Drugs During Lactation; Risk Assessment of Drugs in Lactation; Rational Drug Use in Lactation; Factors Modifying Action of Drugs in Pediatric Patients; Pharmacotherapy of Common

Diseases in Pediatric Patients; Rational Drug Use in Pediatric Patients; Pediatric Drug Formulations; Food and Drug Interactions in Pediatrics; Case Studies.

FKL 545 Geriatric Pharmacology 3+0 7,5
Elderly; Pharmacokinetic Changes During Elderly; Pharmadynamic Changes During Elderly; Common Diseases in Elderly Patients; Drug Safety in Elderly Patients; Inappropriate Medications in Elderly Patients; Common Adverse Drug Reactions in Elderly Patients; Polypharmacy and Drug Interactions; Approach to Geriatric Patients; Factors Affecting Treatment Compliance in Elderly Patients; Drug Safety in Geriatric Patients; Case Studies.

FKL 547 Pharmacotherapy 3+0 7,5
Basic Concepts and Principles of Pharmacotherapy; Rational Drug Use; Drug Therapies for Cardiovascular, Respiratory, Gastrointestinal, Endocrine and Central Nervous Systems, Bone-joint, Ear-Nose-Throat, Infectious, Dermatologic, Ophthalmic, Gynecologic, Obstetric, Renal, Urologic and Oncological Disorders Commonly Encountered in Clinics; Treatment Strategies.

FKL 602 Molecular Pharmacology 3+0 10,0
Receptor theories; quantitative dose-response relationships; apparent agonistic affinity constant; types of antagonism; physiological antagonism; pharmacological antagonism; competitive antagonism; noncompetitive antagonism; competitive and noncompetitive antagonist affinity constants; partial agonist; synergism; radioligand binding; affinity constant and receptor density; receptor isolation; reconstitution; 'knock-out? animal models; receptor cloning; site directed mutagenesis; ion channels; enzymes; ion pumps; mechanism of actions of drug at molecular level.

FKL 607 Introduction to Nervous System 3+0 10,0
Anatomical organization of central nervous system, Meninges and their importance for drugs, brain hemispheres, Telencephalon, Diencephalon, Mesensephalon, Pons, Medulla oblongata, Cerebellum, Ventricles of brain, Circumventriculer organs and CSF, Medulla spinalis, Pathways, Glia, Neuron, Nerve fibers and drugs, Sinaps, action potentials, Neurotransmitters, Receptor, G proteins, Post-receptor mechanisms, ion channels and subtypes, sympathetic and parasympathetic nervous system., observation of drug action on a test system.

FKL 608 Cardiovascular Pharmacology 3+0 10,0
Properties of cardiovascular system; importance of cardiovascular diseases; classification of cardiovascular diseases; regulation of blood pressure; relationship between endothelium and vascular smooth muscle; baroreceptors; regulation of stroke volume; cardiotonic drugs; antiarrhythmic drugs; antianginal drugs; antihypertensive drugs; principles of antihypertensive therapy; antihypercholesterolemic and antihyperlipidemic drugs; antiaggregant drugs; therapy of peripheric vascular diseases; therapy of shock.

FKL 609 Biochemical Pharmacology 3+0 10,0
Drug actions on biochemical parameters; enzymes; basic functions of enzymes; role of enzymes on drug action and metabolism; microsomal enzymes; enzyme kinetics; isolation and purification of enzymes; biochemical indicators of hepatic and renal functions; regulatory peptides and proteins; calmodulin; antiphospholipase proteins; G-proteins, annexines.

FKL 610 Drug interactions 3+0 10,0
Importance of drug interactions; types of drug interactions; pharmacokinetic and pharmacodynamic drug interactions; drug interactions at absroption; drug interactions at distribution and biotransformation; drug interactions at excretion; interactions at site of action; antagonism; synergism; fatal drug interactions; unwanted drug interactions; drug combinations; prevention of drug interactions.

FKL 612 Central Nervous System Drugs 3+0 10,0
Neuron, Neurotransmitters of the central nervous system, receptors and subtypes, Anaesthetics, Local Anaesthetics, Sedative and hypnotics, Alcohol, Antiepileptic drugs, Centrally acting muscle relaxants, Drugs used in Parkinson disease, antipsychotic drugs, drugs used in depression and mania, Central nervous system stimulants, opioid analgesic durgs, observation of drug action on a test model.

FKL 617 Autocoids 3+0 10,0
Description classification of Autocoids; histamine, serotonin, prostaglandins, leukotrienes, lipoxins, plasma kinins, angiotensin, endothelins, nitric oxide; synthesis and secretion of Autocoids; physiological effects of Autocoids; physiopathological roles of Autocoids; receptors of Autocoids; biotransformation of Autocoids; drugs on Autocoids.

FKL 620 Immunopharmacology 3+0 10,0
Definition of immune system; immune system and its interactions with the other neurohumoral factors; classification of immune system and its endogenous parameters; definition of chemokine; chemokine receptors and their classification; immune system disorders; immunodeficiencies; immune system-canser relationships; autoimmun disorders; classification of immune system drugs; immunomodulating immunosuppresant and immunostimulant drugs and chemicals; experimental methods on animals for assaying drugs affecting immune system.

FKL 621 Experimental Pharmacology II 3+0 10,0
Approaches in surgical experimental pharmacology, Surgical approaches to experimental animals, analgesic and anesthetic methods, pharmacological drug research methods at the level of systems, biochemical and immunoassay methods in pharmacology, bioassays, cell and tissue isolation techniques in pharmacology, research methods of ionic mechanisms, data transfer techniques, data analysis in pharmacology, in silico tools, methods and applications.

FKL 622 Ethnopharmacology 3+0 10,0
Definition and scope of ethnopharmacology; Ethnopharmacological approach to drug development; Drugs discovered through ethnopharmacological approach; Investigation of traditional drugs with scientific methodologies; Methods and techniques of drug development from nature; Ethnopharmacology databases; NCI programme for drug discovery.

FKL 623 Pharmacology of Autonomic Nervous System 3+0 10,0
Introduction to autonomic nervous system, organization of autonomic nervous system, Cholinergic transmission, muscarinic and nicotinic receptors, acetylcholine synthesis and releasing, autonomic post-receptor mechanisms, parasympathomimetic drugs, anticholinesterases, parasympatholytics, adrenoceptors, adrenergic transmission, noradrenaline synthesis, storage and releasing, sympatholytics, Adrenergic neuron blockers, Ganglion-stimulating and blocking drugs.

FKL 624 Digital Applications in Pharmacology 3+0 10,0
Computerized automation of pharmacology laboratory; transducers and their uses; isotonic and isometric transducers; blood pressure and bronchospasm transducers; computerized physiological recording systems; plethysmometer; recording and measuring systems for behavioral experiments; calibration of recording systems; measurement and storage of experimental data; data analyses and biostatistical evaluation; pharmacological use of R package program.

FKL 625 Gene Transfere Methods 3+0 10,0
Restriction Endonucleases and Their Use in Recombinant DNA Technology of Nucleases; DNA Cloning; Structures of Plasmid and Bacteriophage; Cloning Eukaryotic DNAs in Bacterial Plasmids; Cloning Eukaryotic DNAs in Phage Genome; cDNA Libraries; Gene Transfer into Eukaryotic Cells; Transgenic Animals and Their Use in Laboratory Studies; Determining Gene Function by Gene Elimination: Use of small RNA interference in Determination of Gene Functions; DNA Sequencing.

FKL 626 Pharmacovigilance and Human Pharmacology 3+0 10,0
Drug use in human; monitoring of critical drugs; factors altering drug effects; side effects; adverse effects; addiction, tolerance and resistance phenomena due to drug use; social pharmacology; drug indications; diet and drug relationships; factors altering drug effects; drug use in case of decreased plasma proteins; drug use in case of hepatic and/or renal insufficiency; placebo; compliance; drug use in pregnancy and lactation periods; drug use in pediatric and geriatric periods; drug contraindications; iatrogenic diseases.

FKL 627 Cardivascular Pharmacology 3+0 10,0
Introduction to cardiovascular system;; Antihypertsensive drugs; Antianginal drugs ; Antiarrhythmic drugs; Drugs used in the treatment of congestive heart insufficiency; Drugs used in the treatment of hyperlipoproteinemia; Anticoagulants, antithrombotic and antithrombocytic drugs; Hematopoietic and hemostatic drugs; Experimental methods used in blood pressure measurements; Experimental methods used in antithrombotic activity measurements; Necessary notions in the evaluation of experimental findings

FKL 628 Blood Physiology 3+0 10,0
Physical Properties and Functions of Blood; Functions of Plasma and Erythrocytes; Erythropoiesis and Factors Affecting Erythropoiesis; Blood Collection Methods; Hemoglobin and Iron Metabolism; Erythrocyte Counting; Anemia; Blood Types; Determination of Hematocrit and Blood Types; Phagocytosis; Inflammation; Structure of Antibodies and Antigens; Innate and Adaptive Immunity; Allergy and Immunizations.

FKL 629 Cell Pysiology 3+0 10,0
Compartments of Fluid Volume and Regulation of Cell Volume; Transport of Substances Across Cell Membrane: Passive and active transport of substances across cell membrane; Functional Structure and Morphology of the Cell: Receptors on cell membrane, Receptors in the cell, G-proteins, Second messengers, Third messengers, Protein kinases, Protein phosphatases; Importance of Cell Skeleton: Structure of microtubules, Function of microtubules, Actin filaments, Intermediate filaments; Cytosolic Movements; Types of Cell Death.

FKL 630 Seminar 3+0 10,0

FKL 790 Thesis 0+1 30,0

FKL 890 Thesis 0+1 30,0

FKL 890-0 Thesis (Thesis Proposal) 0+1 30,0

FKM 505 Seminar 3+0 7,5

FKM 511 Inorganic Drug Chemistry 3+0 7,5
Halogens and Inorganic Drugs Produced by Halogen, Fluoro Compounds: Calcium Fluoride, Chlorinated Compounds: Chlorinated Water, Hydrochloric Acid, Ammonium Chloride, Potassium Chloride, Hypochlorides, Organic Chloride Donors, Bromine Derivatives, Iodine Derivatives, Iodine Disinfectants, Iodine Radioopacs, Iode Oils, 4-Pyridino Iodine Derivatives, Other Iodine Radioopacs, Oxygenic Compounds, Oxygenic Water, Sulphur and Sulphur Compounds, Phosphorus Compounds, Phosphoric Acid, Phosphoric Acid Esters, Arsenic Compounds, Arsenic Organic Compounds, Arsenic Compounds Using Against Syphilis and Amebiozis, Antimony Compounds, Boran Compounds, Silver

Compounds, Organic Compounds of Silver, Gold Compounds, Magnesium Compounds, Barium Compounds, Mercury Compounds, Mercury Diuretics.

FKM 520 Raw Material Production in Pharmaceutical Industry 3+0 7,5

Basic reactions used in drug syntheses, basic processes, process development, optimization of yield, optimization of reagent synthesis, development of convergent synthesis, planning and development of protection steps, easier reagent production, shorter time adjustments, analyses of starting materials used in syntheses, operation security.

FKM 525 Functional Group Analyses in Drug Synthesis I 3+0 7,5

Definition of functional groups, determination of functional groups, use of chemical reactions in determination of functional groups, use of derivative preparing in determination of functional groups, use of UV-visible spectrophotometer methods in determination of functional groups, UV absorption characteristics of organic compounds, dien absorption rules, use of UV visible spectroscopy for structure elucidation, use of IR spectrophotometric methods in determination of functional groups, IR absorption characteristics of important functional groups.

FKM 526 Functional Group Analyses in Drug Synthesis II 3+0 7,5

Use of chemical and 1H-NMR spectral methods in determination of functional groups, chemical shift characteristics of protons in functional groups, use of 13C-NMR spectral method in determination of functional groups, use of advanced techniques and two dimensional NMR techniques in determination of functional groups, use of mass spectral methods in determination of functional groups, functional groups? chemical defragmentation characteristics.

FKM 527 Structure-Activity Relationships in Pharmaceutical Chemistry I 3+0 7,5

Special characters of biological responses, effective pharmacologic factors, pharmacologic factors and Hansch equation, different physicochemical parameters used in quantitative structure-activity relationships, hydrophobic parameter, Hansch's ? constant, Rekkers' f constant, electronic parameters, Hammetts' ? constant, Steric parameter, Tafts' e constant, molecular refractivity, molecular negentropy.

FKM 528 Structure-Activity Relationships in Pharmaceutical Chemistry II 3+0 7,5

Semi-empirical Methods in Pharmacological Research, Free-Wilson Method, Modified Free-Wilson Method, Fujita-Ban Method, Statistical calculations of Fujita-Ban Method, Molecular Connectivity and Calculation of Connectivity indexes, A Level: Atom types, B Level: Numeric ratio of atoms, C Level: General formula, D Level: Atomic arrangement, E Level: The Use of Quantum Mechanics.

FKM 529 Basic Principles of Medicinal Chemistry 3+0 7,5

Biological reactions against drugs: Quantitative reaction, stepped reaction, biometric measurement, drug selection, toxicity tests, clinical tests, absorption and dispersion of drugs, drug transport from biologic membranes. Simple diffusion, transporting over the pores, special transports, pathways of drugs and drug metabolites elimination, biological factors effective in biological system-drug interactions, biotransformation enzymes, intermediary metabolism enzymes, drug receptors. microsomal drug metabolism. Non-microsomal metabolic transformation of drugs, oxidation, reduction, hydrolyses, dehalogenation, conjugation processes, in vivo interactions of drugs with macromolecules, drug interactions with respect to metabolism, development of new drugs from drug metabolites, enzyme inhibition and antimetabolite effect, relationship between drugs? physical properties and biological activities, relationship between drugs? chemical properties and biological activities.

FKM 533 Chemical Separation and Purification Methods in Drug Synthesis 3+0 7,5

Distillation Techniques: Simple distillation, Vacuum distillation, Steam distillation, Azeotropic distillation, Sublimation; Extraction and Separation of Solvents; Crystallization Techniques: Solvent selection, Binary and ternary solvent mixtures; Drying Techniques and Removing of the Solvents; Introduction to Chromatographic Methods: Separation and purification by thin layer chromatography, Separation and purification by colon chromatography, Separation and purification by flash chromatography, Separation and purification by preparative HPLC, Resolution of racemic mixtures; Storage of Synthesized Products.

FKM 535 Chemical Quality Control Steps From Drug Raw Material Synthesis to Product 3+0 7,5

Importance of Quality Control in Medicines; Quality Control in the World Pharmaceutical Industry; Quality Control in the Turkish Pharmaceutical Industry; Definition, Content and Types of Pharmacopoeia; Pharmacopoeia Monograph Review for Drug Examples; Chemical Control in Pharmaceutical Raw Materials; Chemical Control in Pharmaceutical Semi-Finished Materials; Chemical Control in Pharmaceutical Preparations; Documentation Process for Quality Control Steps in Medicine.

FKM 537 Pharmaceutical Nomenclature 3+0 4,5

Methods of Nomenclature; Nomenclature of Basic Structures: Aliphatic hydrocarbons, Cycloaliphatic hydrocarbons, Aromatic hydrocarbons, Heterocyclic compounds; Radicals; Condensed Rings; Fused Cyclic and Acyclic Compounds; Nomenclature of Functional Groups: Halogenated compounds, Oxygen bearing functional groups, Nitrogen bearing functional groups, Sulphur bearing functional groups, Selenium bearing functional groups, Phosphorus bearing functional groups; Cases Related to Stereoisomerism; Special Nomenclature

Required Structures: Natural compounds, Polymers, Supramolecular compounds, Silicon compounds, Boron compounds.

FKM 539 Molecular Modelling in Drug Research 3+0 4,5

Computer Techniques for Development and Optimization of Leading Structure in Drug Research; Molecular Modelling; Molecular Imaging Programmes; Molecular Model Design via Mathematical Methods; Definition of Interactions Between Molecules; Simulation Techniques: Molecular dynamic, Monte Carlo, Energy minimization; Comparative Modelling; Drug Design and Chemoinformatics.

FKM 541 Innovative Drug Molecule Development Principles in Medicinal Chemistry 3+0 7,5

Initial Declaration Including Important Information About Drug Investigation; Active Substance In Drug; Drug Chemistry; Biological Activity and Mechanism of Action; Receptor Term; Importance of Stereochemistry; Active Substance Investigation; Active Substances Isolated from Plants, Animals and Mineral Substances and Their Chemical Structures; Impression Obtained from Studies on These Substances Carried out by Pharmaceutical Chemists, Doctors And Pharmacologists; Chemical Syntheses Inspired from These Compounds; Constituting More Effective Compounds from These Chemical Substances with Structural Alteration.

FKM 543 Working Safely in Laboratory 3+0 7,5

Safe Working and Knowledge Belonging to Hazardous Chemical Regulations; Classification of Chemicals; Explosive, Oxidant, Flammable, Toxic, Irritant, Corrosive, Carcinogen, Mutagen, Radioactive Compounds; Rules Required to Obey While Working Chemical Compounds; Acids and Bases, Alkali Metals, Heavy Metals, Formaldehyde, Sulphurous Compounds; Elementary Processes: Working with Glass Materials, Working under Vacuum; Heating and Cooling Processes; Fire and Fire Protection Methods; Storage and Removal of Chemical Waste; Labeling of Waste Container and Chemical Compounds, Storage; Chemicals which Should not Come into Contact with Each other.

FKM 615 The Methods of Stereospecific Synthesis 3+0 10,0

Chiral Phenomenon, Biological Importance of Chirality, Asymmetrical Synthesis Necessity, Chiral Starting Materials, Selective Syntheses of Enantiomers, Enantiomeric Purification of Natural Compounds, Stereogenic Unit and Chiral Compound Types, Central Chiral Atoms on Nitrogen, Phosphorus and Sulphur, Chiral Molecules Including Unit More than One Stereogenic Unit: Diastereoisomers, Selective Synthesis of Diastereoisomers, Absolute Configuration, Analytic Methods for Enantiomeric Determination, Total Asymmetrical Syntheses of Some Natural Compounds.

FKM 620 Peptide Syntheses 3+0 10,0

Physical and chemical properties of amino acids, synthesis methods for amino acids, separation of chiral amino acids, preparation of amino acid derivatives, attachment of protecting groups to amino acids, amino group, carboxyl group, braced groups, structures used as a protecting group, properties of amid structure, synthesis of amid bonds. Activation of free functions, procedure of acid chloride and azide, symmetrical anhydrides, complex anhydrides, preparation of active esters, properties of peptides, use of protecting groups, amino acids in peptide syntheses, synthesis of homo amino acids, pseudopeptides, synthesis of pseudopeptides.

FKM 621 Heterocyclic Drug Chemistry I 3+0 10,0

The concept of heterocycle, reaction types used in heterocyclic ring synthesis, typical reactant combinations, electrocyclic processes in heterocyclic ring synthesis, nitrenes in heterocyclic ring synthesis, structures and spectroscopic properties of aromatic heterocycles, five-membered, six-membered and condensed bicycled heteroaromatic systems, tautomerism in heterocyclic compounds, reactivity of aromatic heterocycles. Electrophilic addition to nitrogen, electrophilic substitution to carbon, nucleophilic substitution on carbon, deprotonation of nitrogen hydrogen, organometallic derivatives, oxidation and reduction reactions in heterocyclic rings, five-membered rings.

FKM 622 Heterocyclic Drug Chemistry II 3+0 10,0

Benzo-condensed compounds of heterocycles with one heteroatom: Indoles, isoindoles, benzothiophene, benzofuran, synthesis and reaction methods, reactions and syntheses of benzothiophene, reactions and syntheses of benzofuran, 1, 3-azoles: Imidazole, thiazole, oxazole, reactions and syntheses, 1, 2-azoles: Pyrazole, isothiazole, isoxazole, reactions and syntheses, benzo-condensed compounds of azoles. Purines: reactions and synthesis, nucleic acids, nucleosides, nucleotides, five-membered heterocycles with more than two heteroatoms. Six-membered heterocycles with two nitrogen: pyrazine, pyridazine, pyrimidine, reactions and syntheses and their benzo-condensed heterocyclic compounds.

FKM 623 The Mechanisms of Drug Synthesis I 3+0 10,0

Structure and mechanism, use of kinetic data on the elucidations of organic reaction mechanisms, use of isotopes, use of free energy change relations, use of stereochemical criteria, acidity and alkalinity, use of Hammett Equation, the assay of reaction vessel, molecular orbital methods, reactions of electrophilic and nucleophilic substitution, elimination reactions, radicalic, rearrangement and pericyclic reactions.

FKM 624 The Mechanisms of Drug Synthesis II 3+0 10,0

Disconnection approach to the elucidation of reaction mechanisms, basic principles for the synthesis of aromatic compounds, one group C-X disconnection, two group C-X disconnection, the synthesis of amines, C-C disconnection

in alcohols, one group C-C disconnection in carbonyl groups, two group C-C disconnection in diels-alder reactions, disconnection approaches in bifunctional compounds such as 1, 3- 1, 4- 1, 5- and 1, 6-, disconnection in aliphatic nitro compounds and in the synthesis of cyclic structure.

FKM 625 Stereochemistry and Drug-Receptor Relations 3+0 10,0

Basics of stereochemistry, conformation, configuration, characteristics of bonds, geometric isomerism, optic isomerism, polarimetry, racemates, diastereoisomerism, asymmetry and chirality, separation methods for stereoisomers, chemical methods, chromatographic methods, biological methods, determination of spatial configuration, stereochemistry of aliphatic, alicyclic and aromatic structures and nitrogen, stereochemical properties of receptors, stereochemistry of drugs, emergence of diverse biological effects of drugs on the basis of their stereochemical structures.

FKM 626 Drug Enzyme Interactions 3+0 10,0

Relations between physicochemical and physical properties of drugs and their activities, some information on enzymology: velocity of enzymatic reactions, Michaelis Constant, mechanism of enzymatic reactions, active site of enzymes, enzymatic inhibition and different inhibition types, examples of inhibitors, physical appearance of enzyme-inhibitor relations, solubility and pharmacological activity, interfacial tension and pharmacological activity. Relations between electronic and magnetic properties and pharmacological activities, some important electronic properties, correlations between electronic parameters and pharmacological activities, some enzymes: mono amino oxidase (MAO) enzyme, MAO enzymes in different structures, physiological importance of MAO enzyme, inhibition of MAO enzyme, acetylcholinesterase enzyme, inhibition of acetylcholinesterase, carbonic anhydrate enzyme.

FKM 628 Seminar 3+0 10,0

FKM 790 Thesis 0+1 30,0

FKM 890 Thesis 0+1 30,0

FKM 890-0 Thesis (Thesis Proposal) 0+1 30,0

FTE 505 Seminar 3+0 7,5

FTE 521 Good Drug Manufacturing Technique (GMP, GLP, ISO) 4+0 7,5

Introduction and objectives, Validation planning, Controls on raw and packaging materials, Validation of production steps, Documentation, Quality assurance in manufacturing, Validation of quality control methods, Sanitation validation, Production validation of solid oral dosage forms, Production validation of sterile and non-sterile products, GMP guidelines, Good Laboratory Practices (GLP), ISO, Legal requirements.

FTE 522 Methods of Targeting in Pharmaceutical Biotechnology 3+0 7,5

Definition, preparation methods and stability tests of targeted drug delivery systems, techniques to target drugs for specific organs, cells and areas, Active and passive targeting methods for drug delivery systems, Designing targeting systems for biotechnological materials (genetic materials, nucleic acids, proteins), their controls and application fields, Drugs used in Gene therapy: ex vivo gene therapy, in vivo gene therapy, gene transfer methods, non-viral and viral gene transfer methods.

FTE 523 Immunotherapeutic Products and Their Technology 3+0 7,5

Principles of immunology, Definition, production technology and use of immunotherapeutic products, Factors increasing immune reaction, Formation and stages of active and passive immune reaction in immunotherapeutic products, Immune reaction forming agents and their pharmaceutical design and uses, Adjuvants: definition and development of adjuvants, and adjuvant delivering systems.

FTE 526 Biosimilar Products and Their Registration 3+0 7,5

Biological Medicine; Biosimilar Medicines; Criteria for Registration of Biosimilar Products; Reference Products: Reference biological medicinal products; Guides Applicable to All Biosimilar Medicinal Products; Procedure of Recombinant Production and Products; Biological Products Containing Biotechnology-Derived Proteins as Active Substance; Vaccines and Immunological Substances such as Allergens; Blood or Plasma Products and Recombinant Alternative Products.

FTE 527 Physical Pharmacy 3+0 7,5

Rheology, Use of rheology in pharmaceutical technology, Determination of rheological properties, Newtonian systems, Non-Newtonian systems, Viscosity, Reaction kinetics in drug release and stability, Diffusion and dissolution, Physical properties of drug molecules, Interfacial properties, Colloids: Types of colloidal systems, Optical properties of colloids, Electrical properties of colloids, Kinetic properties of colloids.

FTE 529 Pharmaceutical Biotechnology Products and Their Use 3+0 7,5

Biotechnological production of peptide-protein drugs, Oligosaccharides, Vaccines: conventional vaccine techniques, modern vaccine techniques, antiidiotype antibody vaccines, synthetic peptide-based vaccines, nucleic acid vaccines, Insulin, Growth hormone, Interleukins and interferons, Production of recombinant

genetic material, Polymerase chain reaction techniques, Nucleic acid techniques, Virus: viral vectors.

FTE 533 Pharmaceutical Dosage Forms and Quality Controls 3+0 7,5

Forms of Pharmaceutical Dosage: Classification and characterization; Importance of Quality Assurance System and Quality Control: Investigation of ICH and ISO documents related to quality control; Identification of Active Agents and Excipients: Qualitative and quantitative analyses, Identification of impurities and pharmacopeia analyses, Planning and application of analytic method; Quality Control Analysis During the Production and on Finished Products; Specifications of Products and Shelf Life: Microbiological controls, Sterility, Dissolution, Stability tests, Bioavailability analyses, Bioequivalency analyses; Reporting of Analysis Results.

FTE 535 Validation Analysis Methods, Quality Control Systems and Statistical Methods 3+0 7,5

Quality Management System-QMS: Total quality management, Quality assurance (QA), Quality control (QC), Quality management, Standards (ISO 9000-9004); Validation: Cycle validation, Validation standards; Validation of Analytical Procedures: Specificity, Linearity, Accuracy, Precision, Detection Limit, Quantitation Limit, System Suitability, Robustness; ICH Guideline [Q2 (R1)]; Specifications of Dosage Forms: Test procedures and acceptance criteria; Drug Stability Methods, System Compliance Indices; Impurities; Statistical Methods: Numerical process control, Sigma-6 format, Schematism and Quality Monitoring; Records and Reports.

FTE 536 Reaction Kinetics and Physical-Chemical Stability 3+0 7,5

Physical and Chemical Stability; Reaction Rate and Rate Constant; Factors Affecting Reaction Rate; Zero Degree Reactions; First-Order Reactions; Second-Order Reactions; Reaction Degree; Reaction Degree Calculations with Differential Method; Reaction Degree Calculations with Formula Method; Reaction Degree Calculations with Graphical Method; Determination of Stability and Shelf Life Studies; Climate Zones and Storage Temperatures; International Committee on Harmonization (ICH) Stability Documents; Stability Studies with Microsoft Excel.

FTE 537 Patent Rights for Drugs, Drug Lisencing, Harmonization and Industrial 3+0 7,5

Patent: Definition of patent, Importance of patent; International Patent Law; International legislation on patent rights; Protection of patent rights in international research: Intellectual and industrial property rights, Drug lisencing and international harmonization, Legal regulations about drugs in Turkey, Legal regulations about drugs in European Union and World, Common Technical Document.

FTE 538 Analyses of Drug Delivery Systems 3+0 7,5

Basic Analysis Procedures for Drug Delivery Systems: Analytical methods, Spectroscopic methods; Electromagnetic Radiation: Lambert Beer law; Chromatographic Methods: Thin layer chromatography, High pressure liquid chromatography; Thermal Analysis Methods; Differential Scanning Calorimetry; Particle Size Analysis; Zeta Potential Analysis; X-Ray Diffraction Analysis; Bragg's Law; Rheological Analysis; Dissolution Rate Analysis; Physical Analysis of Solid Dosage Forms.

FTE 539 Polymers Used in Drug Delivery Systems 3+0 7,5

Physical and Chemical Properties of Polymers; Classification of Polymers: Biodegradable polymers, Non-Biodegradable polymers; Hydrophobe polymers; Polymeric Drug Delivery Systems; Polymer Drug Interactions; Characterization Studies: Particle size analysis, Zeta potential analysis; Possible Changes in Polymeric Structure: Thermal analyses.

FTE 541 Statistics in Pharmaceutical Technology Research 3+0 7,5

Data Organization and Visualization; Probability; Normal Distribution; Sampling and Sampling Distributions; Standard Deviation and Standard Error; Analysis of Variance; Simple Linear Regression; Correlation Analysis; Multiple Regression; Statistical Applications in Pharmaceutical Technology; Basic Computing Skills for Microsoft Excel; Basic Statistical Applications with Microsoft Excel; Introduction to SPSS and Data Organization; Statistical Applications with SPSS.

FTE 543 Pharmaceutical Unit Operations 3+0 7,5

Adsorbtion; Dose: Dose calculations; Pharmaceutical Water; Grinding; Mixing; Heating; Drying; Filtration; Sterilization: Kinetics of sterilization; Solubilization; Sieving; Distillation; Lyophilization; Evaporation; Pharmaceutical Preformulation Processes; Problems and Their Solutions in Pharmaceutical Formulations; Critical Process Steps in Pharmaceutical Formulations; National and International Measurement Systems Used in Pharmaceuticals.

FTE 620 Parenteral Preparation Technology 3+0 7,5

Application routes of parenteral preparations, Dosage forms, Formulation of dosage forms, Isotonicity and isohydricity, Packaging parenteral preparations, Sterility testing, Pyrogenity testing, Stability of parenteral preparations, Dialysis solutions, Blood and blood products, Vaccines and serums, Implants, Controlled-release parenteral preparations, Parenteral powders, In-process and quality controls on parenteral preparations.

FTE 621 Bioavailability and Bioequivalance 3+0 7,5

Bioavailability (BA), Bioavailability criteria, Bioequivalence (BE), BE calculations, uses of BE calculations, BA/BE study design, BE and solubility, BA/BE studies on pharmaceutical dosage forms, Biopharmaceutical Classification System (BCS),

Biopharmaceutical drug disposition classification system (BDDCS), Problems in BA/BE studies, Regulation on the evaluation of BA and BE of pharmaceutical preparations.

FTE 622 Biopharmaceutic and Pharmacokinetics 3+0 7,5
Factors affecting Absorption-Disposition-Metabolization-Elimination (ADME) steps, Drug absorption, Drug distribution kinetics, Drug elimination kinetics, Calculation of dose regimes and therapeutic window, Fundamental pharmacokinetic concepts, Pharmacokinetic parameters, Pharmacokinetic compartments, Recurrent dose.

FTE 623 Modern Drug Delivery Systems 3+0 7,5
Bioadhesive systems, Transdermal systems, Membrane-controlled systems, Matrix-controlled systems, Osmotic-controlled systems, Diffusion-controlled systems, Erosion-controlled systems, Time-controlled systems, Systems kept in stomach, Topical Drug Applications: ocular systems, nasal systems, oral systems, Rectal and vaginal systems, Topical aerosols, Topical creams, In-process and quality controls on modern drug delivery systems.

FTE 624 Multiple Phase Systems 3+0 7,5
Surface active agents, Pharmaceutical emulsions, Liposomes, Niosomes, Polymeric dispersions, Particular systems, Colloids, Pharmaceutical aerosols, Pharmaceutical suspensions, Bioavailability in multiple phase systems, Stability in multiple phase systems, Scale-up in multiple phase systems, In-process and quality controls on multiple phase systems, Production validation of multiple phase systems, Rheological and mechanical properties of multiple phase systems.

FTE 625 Controlled Release Systems 3+0 7,5
Structure; Physical and Chemical Properties of Polimers Used in Controlled Delivery Systems; Controlled Drug Delivery Systems: Drug release mechanisms and kinethics used in controlled drug delivery systems; Definition of controlled release systems; Importance; advantages; disadvantages and general information about controlled drug release systems; Controlled Relase Systems: Oral systems; Buccal systems; Sublingual systems; Injectable systems; Transdermal systems; Ocular systems; Nasal systems; Rectal and vaginal systems.

FTE 626 Powder Drugs and Micromeritics 3+0 7,5
Powder, Granules and micropellets, Preparation techniques of powder drugs, Importance of particle size distribution, Particle shape and surface area, Particle size measurement methods, Surface area measurement methods, Porosity and density of powders, Rheological analysis on powder and granules, Powder and granule compressibility, In-process and quality controls on powder drugs.

FTE 627 Pharmaceutical Process Validation 3+0 7,5
Validation: Definition of validation; Importance of validation; Pharmaceutical Process Validation; The Regulatory Basics In Process Validation; Organization of Validation; Analytical Method Validation; Cleaning Validation; Equipment Validation; Sterile Product Validation; Validation of Solide Dosage Forms; Validation of Oral/Topical Liquids and Semisolids; Validation of New Products; Retrospective Validation.

FTE 628 Seminar 3+0 7,5

FTE 629 Dissolution Rate in Drug Delivery Systems 3+0 7,5
Solubility: Factors that affects the solubility of active substances; Factors that affect solubility in solid dosage forms; In Vitro Dissolution; Apparatus Used to Determine Dissolution Rate; Design and Calibration of Dissolution Tests; Validation of Dissolution Tests; Role of Dissolution Tests in Drug Development Processes; Evaluation of Dissolution Tests; Calculation of f2 Similarity Factor.

FTE 630 Ocular Drug Delivery Systems 3+0 7,5
Anatomy of the Eye: Eye, Layers of the eye, Cornea, Role of cornea in disposition of active agents; Ocular Application: Targeting, Limitations; Characteristic Properties of Ocular Drug Delivery Systems: Microparticles and Nanoparticles, Dendrimers, Mucoadhesive polymers; Transcorneal Route; Transscleral Route; Intraocular Drug Delivery; Modern Drug delivery Systems in Ocular Drug Delivery.

FTE 631 Solid Drug Delivery Systems 3+0 5,0
Pre-formulation Studies; Dosage Forms; Modifications in Particle Size Distribution; Dissolution Rate; Polymorphic Transformations; Conventional and Controlled Release Tablets: Coated tablets, Capsules; Physics of Tablet Compression; Behaviors of Active Ingredients under Compression; In-Process and Quality Controls on Solid Drug Delivery Systems; Stability; Characterization.

FTE 632 Pharmaceutical Nanotechnology and Drug Targeting 3+0 7,5
Recent Advances and New Approaches in the Development of Pharmaceutical Dosage Forms; Introduction of Modern Therapeutic Systems and the Current Position of Pharmaceutical Nanotechnology; Development of New Drug Delivery Systems; Reduction of Particle Sizes of the Active Substances with Low Solubility to Nanometer Range: Obtaining nanodust and nanocrystal forms, Enhancement of solubility, Enhancement of dissolution rate and bioavailability; Aim and Types of Targeting; Passive and Active Targeting Mechanisms; Physicochemical Properties of Microparticles Systems; Magnetic Targeting; Ultrasonic Targeting; Ligand-Receptor Associated Targeting.

FTE 634 Transdermal and Transmucosal Drug Delivery Systems 3+0 7,5
Anatomy of the Skin; Structure of the Mucosa; Switching Barriers in Transdermal or Transmucosal Penetration: Penetration pathways, Enhancement of the penetration, Penetration enhancers, Characteristic properties of

transdermal and transmucosal drug delivery systems, Excipients and their uses, Commercial product samples.

FTE 638 Semi-Solid Drug Delivery System 3+0 7,5
Classification to European Pharmacopoeia; Vehicles Used in Semisolid Preparations: Hydrocarbon vehicles, Absorption vehicles, Water-miscible vehicles, Water-soluble vehicles; Preparation of Semisolid Formulations; Stability; Characterization; Drug Release and Bioavailability of Semisolid Drug Delivery Systems; Skin and Skin Supplements; Percutaneous Absorption of Semisolid Drug Delivery Systems; Factors Affecting Percutaneous Absorption; Quality Control of Semisolid Drug Delivery Systems.

FTE 790 Thesis 0+1 30,0

FTE 890 Thesis 0+1 30,0

FTE 890-0 Thesis (Thesis Proposal) 0+1 30,0

FTK 503 Industrial Toxicology 3+0 7,5
Airborn Poisons: Airborn Chemical Substances in the Industry and the Industrial Poisons: The harmful effects of the industrial poisons, Industrial wastes, Wastes from houses, The allowable and toxic limit values of the airborn substances, Acute intoxications with industrial poisons: Important Toxic Gases: Important Toxic Dusts: Organic Solvents: Metallic Poisons: Chemical Carcinogens: Chemical War Agents.

FTK 504 Environmental Toxicology and Pesticides 3+0 7,5
The Physical, Chemical and Physicochemical Properties of the Soil: Environmental Pollution: Soil, Water and air pollution: Drugs and Related Substances Used in Agricultural Prevention: Pecticides and Their General Properties: The Useful Effects of Pesticides, Insecticides, Herbicides, Rodenticides, Fungicides: Several Important Toxic Materials Present in the Environment: Radiation and Radioactive Isotopes: Natural Poisons: Plant poisons, Animal poisons.

FTK 505 Seminar 3+0 7,5

FTK 507 Food Toxicology 3+0 7,5
The Food Additives: Mycotoxins and Mycotoxicoses: Important Mycotoxiceses: Botulism: Bacterial Food Intoxications: Intoxications with Foods Including Caffeine: Mushroom Intoxications and Treatment: Toxicants Present in Natural Foods: Food Allergies and Their Intolerance: The Harmful Effects of the Drugs and Chemical Substances Present in the Foods: The Assessment of the Containers Used As Food Package.

FTK 508 Drug Dependence, Doping Substances Used in Sports 3+0 7,5
Drug abuse, tolerance related to the substances, physical and psychological dependence, toxic effects of the drugs used for doping and doping control subjects are described in this lecture.

FTK 509 Analytical Toxicology Methods 3+0 7,5
General Information on Analytical Toxicology Techniques: Systematic Toxicological Analysis: Extraction and separation of samples and analysis lines; Analysis of Some Important Poisons in Biological Material: Isolation and analysis of volatile poisons in biological samples, Isolation and analysis of nonvolatile organic poisons in biological material, Isolation and analysis of metallic poisons in biological material, Analysis of toxic anions in biological material; Poisons that Require Special Analysis; Quick Systematic Analysis Used in Acute Clinical Cases: Analysis of the gastric lavage ingredients, Blood analyses, Urine tests; First aid in the laboratory.

FTK 790 Thesis 0+1 30,0

FTM 501 Advanced Pharmaceutical Microbiology 3+0 7,5
Biology of Microorganisms: Bacteria, Yeast and moulds, Viruses, Principles of microbial pathogenity and epidemiology; Antimicrobial Agents: Types of antibiotics and synthetic animicrobial agents, Clinical uses of antimicrobial drugs, Manufacture of antibiotics, Mechanisms of action of antibiotics, Banterial resistance to antibiotics, Chemical disinfectants, anticeptics and preservatives, Non-antibiotic antimicrobial agents, Mode of action of non-antibiotic antibacterial agents, Resistance to non-antibiotic antimicrobial agents..

FTM 502 Methods for Determining Antimicrobial Activity 3+0 7,5
Introduction to Antimicrobial Susceptibility Tests; Mechanisms of Microbial Resistance; Antimicrobiyal Susceptibility Tests: The effecting factors of antimicrobial susceptibility tests, Qualty control and qualty control agents, Diffusion tests, Stokes test, The Kirby-Bauer test, Dilution tests: Microdilution susceptibility test, Macrodilution susceptibility test, Agar dilution susceptibility test, Dilution-Diffusion tests, Epsilometer test; Interpretation of Results; Antifungal Activity Tests.

FTM 503 Advanced Pharmaceutical Microbiological Applications 3+0 7,5
Working Safely in the Laborotory: General considerations and physical hazards, Risk reduction ın the laboratory; Working Safely with Chemicals: Strategies for minimizing chemical hazards; Working safely with biological materials: Introduction to biological safety, Strategies for minimizing the risk of biohazards, Spesific laboratory biohazards: Microorganisms, Human blood products, Tissue culture, Recombinant DNA, Laboratory animals; Response to biohazards spills; Tissue Culture Applications; Applications

of Antimicrobial Activity Testing; Applications of Ames Testing.

FTM 504 Seminar 3+0 7,5

FTM 505 Methods of Sterilization and Disinfection 3+0 7,5
Introduction to Sterilization Methods: Physical Antimicrobial Control: Heat sterilization, Measuring heat sterilization, Endospores and heat sterilization, The autoclave, Pasteurization; Radiation Sterilization: Ionizing radiation, Radiation practice; Filter Sterilization: Depth filters, Membrane filters; Chemical Antimikrobiyal Kontrol: Measuring chemical sterilizants; Disinfectants, Sanitizers and Anticeptics.

FTM 506 Microbial Toxins 3+0 7,5
Introduction to Microbial Toxins; Endotoxins: Structure of the endotoxins; Physiological effects of the endotoxins, Lipopolisaccharides; Exotoxins: Structure of the exotoxins, Physiological effects of the exotoxins, Diphteriae toxin, Cholera toxin, Esherichia coli toxin, Pertussis toxin, The other exotoxins; Fungal Toxins: Structure of fungal toxins, Physiological effects of the fungal toxins; Intoxications.

FTM 507 Methods of Measuring Microbial Population 3+0 7,5
Introduction to Measuring Microbial Population; Direct and Indirect Methods: Total and viable counts; Measuring Microbial Population in the Cultures; Methods of Measuring Microbial Population Count Upon Metabolism; Other Methods; Measurement of Yeast; Measurement of Mold; Measurement of Anaerobic Microorganism.

FTM 508 Microbiolagical Control Techniques of Sterile Pharmaceutical Products 3+0 7,5
General Sterilization Methods; Validation of the Sterilization Processes; Sterility Assurance; Phisical, Chemical and Biological Sterility Testing; Sterile and Non-sterile Pharmaceutical Products; Microbial Contamination when Preparing, Transporting and Using Sterile Products; Protecting Methods of Contamination; Cleanrooms and Aseptic Processing for Pharmaceutical Production; Viable Microorganisms in Pharmaceutical Products.

FTM 509 Isolation and Typing Methods of Bacteria 3+0 7,5
Bacterial Sampling Techniques; Isolation of Bacteria from Different Sources; Media for Bacterial Growth; Culture Preservation Techniques; Bacterial Identification and Typing: Conventional Tests, Immunological Tests, Phenotypical Tests, Genotypical Tests; Introduction to Classification and Phylogeny.

FTM 510 Chemotherapeutics and Their Mechanisms of Action 3+0 7,5
Chemotherapeutics inhibiting biosynthesis of bacterial wall and their mechanisms of action: Penicillines, penicilline-derived beta-lactams, Chephalosporines, Other beta-lactam drugs; Chemotherapeutics inhibiting protein biosynthesis; Chemotherapeutics inhibiting DNA biosynthesis; Chemotherapeutics that interfere with cell membrane biosynthesis and selective permeability of bacteria; Antiviral Drugs and their mechanisms of action; Antifungal Drugs and their mechanisms of action; Antiparasitic Drugs and their mechanisms of action.

FTM 511 Enzyme Technology 3+0 5,0
Structure and Function of Enzymes: An ıntruduction to enzymes, The naming and classificition of enzymes; The Structure of Proteins: Aminoacids, The basis of protein structure; The Biosynthesis and Properties of Proteins; Monomeric and Oligomeric Enzymes; Kinetic and Chemical Mechanisms of Enzyme-Catalysed Reactions; Enzyme Inhibition: Reversible and Irriversible Inhibition; Application of Enzymes: Biotechnological applications of enzymes, Some applications of enzymatic analysis in medicine, ındustry and pharmaceutical technology.

FTM 512 Molecular Genetics of Bacteria 3+0 5,0
Genetic Structures of Bacteria and Characteristics; Bacterial Replication, Transcription and Translation Mechanisms; Gene Regulation; Operon Consept; Recombination Mechanisms In Bacteria; Transformation, Conjugation, Transduction, Mutations of Genetic Structure, Bacterial Mutations; Mutation Repair Mechanisms; Bacterial Plasmids; Plasmid Transfer Mechanisms; Causes of Bacterial Resistances and Transfer Mechanisms.

FTM 513 Allergy 3+0 7,5
Mechanisms of Hypersensitivity; Definitions; Prevalence; Allergens; Susceptibility to Allergy; Mechanisms and Classification of Allergic Diseases: The IgE/Mast cell/mediator pathway, The IgE or IgM/complement/neutrophil pathway, The Effector T lymphokine pathway; Atopic Diseases; Anaphylaxis and Urticaria; Immune-Complex Allergic Diseases; Cell-Mediated Hypersensitivity Diseases; Drug Allergy; Tumor Immunology; Transplantation Immunology.

FTM 514 Antineoplastic, Immünosupressan and Antimicrobial Drugs and Their Mechanisms of Action 3+0 5,0
Anticancer Agents: Alkylating agents, Antimetabolites, Microtubul inhibitors, Antibiotics, Hormones and their antagonists; Other anticancer agents; Immonosupressive Agents: Corticosteroids, Cytotoxic agents; Antiviral Agents: Agents for respiratory system and Herpes infection, Immunomodulators; Antifungal Agents: Systemic and superficial antifungal agents; Antiparasiter Agents: Antiprotozoal and antihelmintic agents.

FTM 515 Serology and Serological Techniques 3+0 7,5
Structure of Antigens and Antibody; Methods for Detection of Antigens and Antibody; Serum Immunoglobulin Levels in Health and Disease; Clinical Laboratory Methods: Precipitations, Agglutination, Hemagglutination, Immunology of Blood Groups; Radioimmunoassay;

Immunofluorescence; Complement Assays; Hemolytic Assays; Monoclonal Antibodies: Production techniques, Application of monoclonal antibody; Detection of Cellular Immunity; Immunohematology; Transfusion Reactions; Histocompatibility Testing.

FTM 516 Antimicrobial and Immunostimulan Plants 3+0 5,0

Introduction to Antimicrobial and İmmünostimulan Plants; History, Morphological properties of antimicrobial and immunostimulan plants, Widespreading, Collecting, Depositing, Using parts, Conteins, and effective compounds, Getting ways of effective compounds, Using to treatment and warning; Antimicrobial Plants: Tilia argentea, Matricaria chamomilla, Thymus sp, Origanum, Mentha sp., Artemisia absinthium, Artemisia vulgaris, Salvia officinalis, S. triloba, Rosa damascena, Viola tricolor; Immunostimulan Plants: Echinanacea purpurea, Echinanacea angustifolia, Arnica montana, Cetraria islandica.

FTM 517 Virology 3+0 7,5

Introduction to Viruses; Virology Terms and Definitions; General Properties of Viruses; Evolutionary Origin of Viruses; Principles of Viral Structure: Viral genetic material, Structure of capsid, Chemical composition of viruses; Classification of Viruses; Equipment of Virology Laboratory; Cultivation of Viruses; Tissue Cultures and Other Methods; Viral Applications; Purification and Identifications of Viruses; Reaction to Physical and Chemical Agents; Replication of Viruses; Viral Contaminations and Pathogenesis; Viral Infections in Human; Diagnosis of Viral Infections.

FTM 518 Cosmetic Microbiology 3+0 7,5

Introduction to Cosmetic Microbiology; Cosmetic Microbiology Terms and Definitions; Intrinsic and Extrinsic Factors Affecting Fungal Growth in Cosmetic Products; Microbial Contamination to Cosmetic Products; Microbiota in Cosmetic Products; Microbial Limits on Cosmetic Products; Products Sensitive to Microbial Contaminations; Microbial Effects on Cosmetic Products; Sterile Pharmaceutical Products; Packing; Sterilization; Quality Control and Safety; Preparation of Apyrogenic Products; Production of Sterile Pharmaceutical Products; Controlling of Sterile Pharmaceutical Products; Pyrogen and Endotoxin Testing.

FTM 519 Molecular Microbiological Techniques 3+0 7,5

Introduction to Molecular Microbiology; Molecular Microbiology Laboratory Equipment; Microbial Isolations: Prokaryotic DNA isolation and analysis, Eukaryotic DNA isolation and analysis, Plasmid and organelle DNA isolation and analysis, RNA isolation and analysis; Electrophoretic Methods; Polymerase Chain Reaction, Optimization and Scanning; Types of PCR: Multiplex, Nested, Real-Time, Hot-Start; Diagnosis Methods Based on Restriction Enzymes; Protein Isolation Methods; Analysis and Purification; DNA Sequencing Analysis Methods; Microarray Technology.

FTM 520 Micology 3+0 7,5

Introduction to Fungi; Mycology Terms and Definitions; General Properties of Fungi; Classification of Fungi; Cultivation of Fungi; Fungal Metabolism and Fungal Products; Fungal Ecology; Controlling of Fungal Growth; Fungal Infections in Human: Superficial mycoses, Subcutaneous mycoses, Deep mycoses, Opportunistic mycoses; Actinomycetes; Hypersensitivity to Fungi; Mycotoxins; Fungal Industrial Applications.

FTM 522 Industrial Microbiology 3+0 7,5

Introduction to Industrial Microbiology; Importance of Industrial Applications; Characteristics of Industrial Microorganisms; Ways to Enhance Industrial Strain; Industrial Fermentation Products: Microbial biomass, Microbial macromolecules, Primary metabolites, Secondary metabolites; Industrial-Scale Production and Properties: Control of fermentation systems, Monitoring and yield; Industrial Raw Materials; Industrial Microorganisms; Important Products Obtained from Microorganisms for the Healthcare Industry.

FTM 524 Microbial Metabolism 3+0 7,5

Microbial Systems; Microbial Ecology; Microbial Nutrition; Membrane Transport Processes; Energy Metabolism of Microorganisms 1; Energy Metabolism of Microorganisms 2; Regulation of Microbial Metabolism: Fatty acid and lipid metabolism, Nitrogen metabolism, Phosphorus and sulfur metabolism; Metabolic Interactions in Microbial Communities; Metabolic Properties of Microorganisms and Their Use in Industry; Metabolic Engineering: Applications of metabolic engineering.

FTM 790 Thesis 0+1 30,0

FTT 501 Principles of Phytotherapy 3+0 7,5

Phytotherapy definitions; History of phytotherapy; Laws, bylaws, and regulations; Phytotherapy as a complementary medicine; Aromatherapy, homeopathy, traditional Chinese medicines (TCM), Ayurveda, Unani Medicines; Phytotherapy applications in EU and other countries.

FTT 502 Herbal Preparation-Drug-Food Interactions in Phytotherapy 3+0 7,5

Types and descriptions of herbal preparation-drug-food interactions; Age, gender, race factors influencing interactions; Synergistic and antagonistic herbal preparation-drug-food interactions; The impact and importance of herbal preparation-drug-food interactions; Side and adverse effects, warnings; Acute and chronic interactions; Herbal preparation-drug interaction examples; Food-drug interaction examples; Case studies.

FTT 503 Drugs Used in Phytotherapy I 3+0 7,5

Drugs used in central nervous system disorders, dosages, preparations; Drugs used in respiratory tract disorders dosages, preparations; Drugs used in urinary system

disorders their dosages, preparations; Drugs used in cardiovascular system disorders their dosages, preparations.

FTT 504 Drugs Used in Phytotherapy II 3+0 7,5
Drugs used in digestive system disorders, dosages, preparations; Drugs used in obesity, dosages, preparations; Drugs used in skin diseases, traumatic disorders, rheumatism and inflammations, dosages, preparations; Drugs used in immune system disorders, dosages, preparations; Drugs used as adaptogens, dosages and their preparations.

FTT 505 Standardization of Drugs used in Phytotherapy 3+0 7,5
Drugs and herbal preparations (extracts, essential oils, fatty oils, etc.) used in phytotherapy; Storage conditions; Packaging; Quality control and assays; Pharmacopeia, EMA, ESCOP, WHO, and Commission E monographs; Drug conformity.

FTT 506 Introduction to Phytochemistry 3+0 7,5
Academic deparments investigating herbal drug raw materials: definitions, history, interdisiplinary departments; Plants as herbal drug sources: cultivation, harvesting, drying, storage, packaging, trading; Isolation of active ingredients from drugs: extracts, purification of extracts; Analytical methods; Chromatography; Biosynthesis in Plants; Primary metabolites, general information; primary metabolite drugs; carbohydrates and identification reactions; Gums and identification reactions; Mussilage; Agar and identification reactions; utilization of primary metabolites.

FTT 508 Secondary Metabolites I 3+0 7,5
Glycosides; general information, isolation, chemical structure, classification, identification reactions and quantification; Alkaloids; general information, isolation, chemical structure, classification, identification reactions and quantification; Halusinojenic drugs: general information, isolation, chemical structure, classification, identification reactions and quantification; Glycoside / Alkaloid Herbal Drug Monographs in the European Pharmacopeia and their utilization.

FTT 510 Secondary Metabolites II 3+0 7,5
Tannins; general information, isolation, chemical structure, classification, identification reactions and quantification; Essential Oils; general information, isolation, chemical structure, classification, identification reactions and quantification; Lipids: general information, isolation, chemical structure, classification, identification reactions and quantification; Enzymes; general information, isolation, chemical structure, classification, identification reactions and quantification; Tannin, Essential Oil and Enzyme Herbal Drug Monographs in the European Pharmacopeia and their utilization.

FTT 512 Microscopic Characteristics of Herbal Teas 3+0 7,5
Definition and Types of Herbal Teas; The European Pharmacopoeia Monographs on Herbal Teas; Definition and Basics of Light Microscope; Preparation Techniques of Powdered Drugs; General Microscopic Characteristics of Leaf, Flower, Root, Bark, Fruit and Seed; Microscopic Characteristics of Herbal Tea Drugs; Drugs of Umbelliferae, Drugs of Labiatae, Drugs of Compositae, Drugs of Rosaceae, Other herbal drugs.

FTT 521 Term Project 3+0 15,0

İST 543 Statistics I 3+0 7,5
Statistics II: Statistics Definition, History, General İnformation About the Area; Responsive and Non-Responsive Averages: Arithmetic, Geometric, Harmonic, Quadratic, Mode, Median, Quartiles; Variability: Variance, Standard Deviation, Coefficient of Variation; Variables Discrete Probability Distributions: Binomial, Poisson; Continuous Probability Distributions of Variables: Normal Distribution; Symmetry, Asymmetry, and Kurtosis Taper; Moment: Regression Analysis, Categorical Data Analysis, Chi-Square Test.

İST 632 Statistics II 3+0 6,0
Statistics II: Statistical Decision Theory: Hypothesis Testing, Parametric and Non-Parametric Approaches, With Large Sample Hypothesis Testing, Hypothesis Testing With Small Samples; Strength Testing; Chi-Square Distribution: Chi-Square Tests; Simple Linear Regression and Correlation Techniques, T-Test; Analysis of Variance; Analysis of Covariance; Random Block Design; Factorial Experiments; Multivariate Statistical Tests; Factor Analysis; Multivariate Analysis of Variance; Multivariate Analysis of Covariance.

KİM 541 Instrumental Analysis I 3+0 7,5
Calculation and evaluations in analytical chemistry: via pharmacopoeia, external standard, internal standard and standard addition; Methods based on light-matter: Absorptional: UV-VIS, IR spectrophotometry, absorption-emission: Fluorescence, scattering: Turbidimetry, Nephelometry, Polarimetry, Refractometry; Chromatographic methods; Adsorptional, Partitional, Ion exchange and Exclusive: Column chromatography, Thin layer chromatography, HPLC, Electrochromatography, Gas chromatography. Their applications.

KİM 542 Instrumental Analysis II 3+0 7,5
Potentiometry: Theory and certain applications; Potentiometric titrations; pH titrations; Evaluations of titrations via derivations; Polarography: Direct current, DP, SCAP and SIAC techniques; The importance of electrode, cell and supporting electrodes; Capillary electrophoresis: Electroosmosis, electrophoretic mobility; Related techniques in CE: Zone Electrophoresis, MEKK and others; Mass spectrometry.

KİM 544 Stochiometry and Solutions 3+0 7,5
Basic concepts: Mole, Atom-gram, Equivalent-gram, Molarity, Normality; Preparation of Normal and molar solutions; Chemical equilibrium Homogenous equilibrium and heterogeneous equilibrium; Definition of chemical reactions and provision of the balance: Neutralization, Redox, Proportionality; Stochiometric calculations; Solubility: Solubilization of the compounds.

KİM 545 Seminar 3+0 7,5

KİM 546 Techniques in Laboratory 3+0 7,5
Methods: Maintenance of glassware and points one should take care of them during use; Balance: Maintenance and usage: Chemicals: points one should take care of them during use: Maintenance of some instruments and their calibrations; Separations: Filtrations; Centrifugations, Extractions, Masking; Production of certain home-made instruments.

KİM 548 Principles of Analytical Chemistry 3+0 7,5
Equilibrium in chemistry: Reactions, Factors affecting equilibrium; Solutions: Definitions, Preparations; Stochiometry: Various Concentrations, Molarity, Normality; Calculation of pH: strong acids and strong bases, Weak acids and weak bases; Volumetry: Neutralimetry, Theory of redox, Complexes; Gravimetry; Activity.

KİM 553 Basic Analysis Methods 3+0 7,5
Determination of melting point; determination of freezing point; Determination of distillation range; Determination of boiling point; Determination of refractive index; Determination of optical rotation and specific optical rotation; Density: relative and apparent density, Measurement of viscosity; Determination of specific surface area; Thermal analysis; Certain determinations: Ethanol; Nitrogen; Glucose in hemodialysis solutions; Humidity; Ash; Organic compounds.

KİM 554 Usage of Analytical Methods for the Food Safety 3+0 7,5
Hazard Analysis and Control Critical Points (HACCP): The concept of HACCP, The applications of HACCP; Determination of Conditions for Keeping Food; Preparation of food for analysis; Food Elements: Analysis of useful substances in food, Determination of hazardous substances in food, Assay of the useful substances in food, Assay of the hazardous substances in food, Determination of additives in food, Assay of additives in food.

KİM 555 Inorganic Analysis 3+0 7,5
General rules in periodic table; Qualitative inorganic analysis; Quantitative inorganic analysis: Metals, Non-metals, Halogens; Elemental analysis: Carbon, Hydrogen, Nitrogen, and Sulfur.

KİM 556 Drug Analysis in Biological Fluids 3+0 7,5
The importance of drug analysis in biological fluids, Special problems with biological fluids, Special problems about drug structures, Spectroscopy and fluorimetry, Planar chromatography, Gas Chromatography, High-Performance Liquid Chromatography, Radioimmunoassay and other ligand analyses, Drug analysis through such Techniques as GC-MS and LC-MS, Method development and evaluation, Quality control, Discussion

KİM 557 Introduction to Separation Methods 3+0 7,5
Separation by precipitation, Separation by distillation, Separation by extraction (solid-liquid), Separation by extraction (liquid-liquid), Separation by sublimation, Chromatographic separations, Liquid Chromatographic separations, Gas Chromatographic separations, Electrophoresis, Applications.

KİM 559 Theoretical and Practical Aspects of Experimental Design in Analytical Chemistry 3+0 7,5
General approach to experimental design in analytical chemistry; How to choose the right methodology in experimental design; Experimental design prior to sample; Other critical points in experimental design; Steps of method development; Method optimization; International applications and new designations in the validation of analytical methods; Statistical analysis and interpretation of experimental results; Use and design of secondary analysis methods for comparison; Discussion of the theoretical and practical deficiencies of a designed methodology; Finalization of experimental studies and care of laboratory instruments

KİM 572 Method Validation in Analytical Chemistry 3+0 7,5
Validation: Definition, Parameters, Guidelines, Similarities and differences, Calculations; Stability: Short term, Long term; Specificity; Degradation Studies; Linearity: Range, Calibration; Accuracy; Precision: Repeatability, Intermediate precision; Limit of Detection and Limit of Quantification; Robustness and Ruggedness; System Suitability Tests: Theoretical plate, Resolution; Validation in Bioanalytical Methods.

KİM 574 Chemometric Techniques for Quantitative Analysis 3+0 7,5
Introduction to Chemometrics; Basic Approaches; Data Collection and Data Sets; Data sources, Data matrices, Data sets, Training sets; Basics of MS-Excel: Creating functions, Creating graphs; Classical Least Squares; Inverse Least Squares; Factor Spaces; Principal Component Regression (PCR); Partial Least Squares (PLS); The Techniques in Action: Quantitative analysis, Purity analysis.

KİM 604 Seminar 3+0 7,5

KİM 626 Physicochemical Experiments 3+0 7,5
Physicochemical determinations: Melting point, Boiling point; measurement of density; Concepts of pH and its calculations; Measurement of partition coefficient; Determination of certain compounds in blood using partition coefficient; Determination of molecular weight; Measurement of viscosity; solubility and measurement of solubility; Osmotic pressure and its importance in biology; Determination of the physicochemical constants of certain compounds.

KİM 627 Polarography 3+0 7,5
Theory of polarography; Parameters related with polarography: pH, Supporting electrolyte, Pressure, Temperature, Dropping time, rate of potential, Electrocapilarity; Elucidation of factors affecting the polarographic current: Diffusional, Adsorptional, Kinetic and catalytic; Polarographic maximum; Polarographic techniques and their applications; Direct current, Differential pulse, Superimposed constant amplitude pulse, Superimposed increasing amplitude pulse.

KİM 628 Capillary Electrophoresis 3+0 7,5
Theory; Various modes of capillary electrophoresis: capillary zone electrophoresis (CZE), capillary gel electrophoresis(CGE), micellar electrokinetic chromatography (MEKC), capillary electrochromatography (CEC), capillary isoelectric focusing (CIEF), capillary isotachophoresis(CITP); Sample injection methods: electrokinetic injection, hydrodynamic injection; Detectors; Column technology: Uncoated column, coated column; Electrolyte systems: Buffers, Solubility and stability of substances, Ionization of analytes, Buffer anions, Buffer cations, Effect of organic modifiers, pH and ionic strength, Effect of temperature.

KİM 629 Applications of Voltammetric Techniques 3+0 7,5
Theory of voltammetry; Electrode types in voltammetry: Pt electrode, Au electrode, Glassy carbon electrode, Carbon paste electrode; Study of voltammetric technique: Stationary electrode, Rotating electrode, Other techniques; Parameters of study techniques: Effect of pH, Carrying electrolyte systems, Effect of potential speed, Effect of rotating speed, Effect of concentration, Repeatability, Detection limit; Using voltammetry in various areas: Drug analysis, Biological assays, Other applications.

KİM 638 Non-aqueous Media Titrations 3+0 7,5
Theory; The solvent effects: The effect of acidic or basic characters, The effect of dielectric constant; The choose of solvent and titrant, Amphiprotic solvents, Aprotic solvents, The equivalent point assay methods: Potentiometric methods, The choose of indicator, Conductometric methods, Thermometric methods; Applications: The titrations of acids, The titrations of bases, The titrations of mixture, The titrations of amines and amides, Other substances(salts, epoxides, sulfoxides, nitro compounds, quaternary ammonium compounds, etc).

KİM 639 Food Analyses Methods 3+0 7,5
Proteins and their assay; Aminoacids and their assay; Carbohydrates and their assay: Monoshaccaride determinations, Polyshaccaride determinations; Oils and their assay: Fixed and essential oils, Oil indexes; Vitamins and their assay: The water-soluble vitamins, The water-insoluble vitamins; Inorganic elements and their assay; The special methods for same foods (meat, milk, honey, juice etc.); The analyses during the food preparation; Food additives and their analysis methods.

KİM 653 Conductometry and Potentiometry 3+0 7,5
Theory and basic principles; Conductometry and conductivity cells; Conductometric titrations, Conductometric pKa assay; Conductometric solubility assay; Conductometric hydrolysis constant assay, Conductometric dielectric constant assay. Principles and theory; Electrode types: Silver/ silver chloride electrode, Calomel electrode, Glass electrode, Quinone/hydroquinone electrode, Ion-selective electrodes; Potentiometric titrations and their applications; pKa determinations by potentiometry.

KİM 655 High Pressure Liquid Chromatography and Applications 3+0 7,5
Separation mechanisms, Instrument, Separation columns, Mobile phase, Detectors, Method development and optimization, Evaluation of results, Applications.

KİM 660 The Analytical Methods for the Determination of Antioxidant Activity 3+0 7,5
Antioxidant Molecules and the Determination of Antioxidant Activity: Natural antioxidants, Artificial antioxidants, Methods depending on hydrogen transfer, Methods depending on electron transfer, Other methods; DPPH Method: Principles, Applications; Folin-Ciocalteau Method: Principles, Applications; ABTS/TEAC Method: Principles, Applications; CUPRAC Method: Principles, Applications; ORAC Method: Principles, Applications; Laboratory Practices; Determination of Antioxidant Activity with HPLC; Determination of Antioxidant Activity with TLC; Determination of Antioxidant Activity with GC; Determination of Antioxidant Activity with Electrochemical Methods.

KİM 661 Liquid Chromatography-Mass Spectrometry (LC/MS) and its Applications 3+0 7,5
Introduction to LC/MS; From Liquid Phase to Electric Field (Ionization Techniques): Electrospray ionization, Electrospray chemical ionization, Electrospray photo ionization; Selection of an Ionization Technique; Mass Spectrometry; Mass Analyzers: Quadrapole, Ion trap, Time of flight, Multiple analyzers; Evaluation of Mass Spectrum; Evaluation of LC/MS Chromatograms; LC conditions for LC/MS; Analytical Method Development with LC/MS; Application Areas for LC/MS; Future of LC/MS.

KİM 662 Column Technologies in Liquid Chromatography 3+0 7,5
Introduction to Column Technologies; Column Design and Hardware; Separation Modes; Types of Stationary Phases; Column Packing Materials; Surface Chemistry and Geometry; Retention Models and Selectivity; Column Selectivity in Reversed Phase Liquid Chromatography; Columns for Special Applications; New Trends in Column Formats; Quantitative Structure-Chromatographic Retention Relationships; Column Classifications and Equivalency; Column Maintenance and Regeneration; Frequently Asked Questions.

KİM 663 Bioanalytical Sample Preparation Techniques 3+0 7,5
Importance of Bioanalytical Sample Preparation Stage; Points to Consider in Sample Preparation; Classification of Bioanalytical Sample Preparation Techniques; Protein Precipitation: Principles, Precipitating agents; Dilution Followed by Injection and Filtration; Liquid-Liquid Extraction: Principles, Method development and optimization strategies; Applications of Liquid-Liquid Extraction; Solid-Phase Extraction: Principles, Method development and optimization strategies; Applications of Solid-Phase Extraction; Use of Liquid Chromatography for Sample Preparation Purpose; Monolithic Columns; Combinations of Techniques.

KİM 790 Thesis 0+1 30,0

KİM 890 Thesis 0+1 30,0

KİM 890- Thesis (Thesis Proposal) 0 0+1 30,0

KOZ 505 Seminar 3+0 7,5

KOZ 509 Ethical and Legal Applications in Cosmetic Production 3+0 5,0
Selection of Volunteers; Volunteer Contract; Turkish Cosmetic Regulations; Licensing; EC Regulations; Harmonization.

KOZ 510 In Vivo Tests Applied to Cosmetics 3+0 5,0
Tests on Volunteers: Measurement of Skin Moisture, Measurement of Skin pH, Measurement of Skin Sebum, Measurement of Skin Elasticity, Measurement of Skin Erythema, 3-Dimensional Measurement by Skin Visiometer, Replica Studies and Analyses on Volunteer Skin, Statistical Evaluation of Test Results, Dermatological Use Tests for Cosmetic Products, Panel Tests on Volunteers.

KOZ 511 Cosmetic Delivery Systems 3+0 7,5
Cosmetic Emulsions, Cosmetic Lotions, Cosmetic Creams, Cosmetic Vesicular Systems, Cosmetic Porous Polymeric Systems, Cosmetic Particular Systems, Cosmetic Molecular Systems, Facial Masks, Soaps, Manicure Preparations, Pencils, Depilatories, Deodorants, Antiperspirants, Hair Cleansing Products, Cosmetic Gels, Tooth Pastes.

KOZ 512 Quality Control and Assurance of Cosmetic Preparations 3+0 7,5
Control of pH in Cosmetic Preparations, Control of Viscosity in Cosmetic Preparations, Control of Globule Size in Cosmetic Preparations, Control of Stability in Cosmetic Preparations, Quality Assurance System in Cosmetic Preparations, Control of Raw Materials and Packaging in Cosmetic Preparations, Safety of Cosmetic Preparations, Safety Testing Methods for Cosmetic Preparations, Conformity to Standards in Cosmetic Preparations.

KOZ 513 Cosmetic Raw Materials and Their Functions 3+0 7,5
Oils Used for Cosmetic Purposes, Surface Active Agents Used in Cosmetic Preparations, Color and Fragrance Materials Used in Cosmetic Preparations, Moisturizers Used in Cosmetic Preparations, Emollients Used in Cosmetic Preparations, Plant Raw Materials Used in Cosmetic Preparations, Animal Raw Materials Used in Cosmetic Preparations, Synthetic Raw Materials: Classification by Purpose of Use.

KOZ 514 Cosmetic Preparation-Application Relation 3+0 5,0
Properties of Skin, Defense Function of Skin, Absorption Function of Skin, Storage Function of Skin, Skin Aging and Maintenance of Skin Health, Skin Layers, Skin Supplements, Cosmetology and Hair, Natural Structure of Hair, Cosmetology and Nails, Structure of Mucosa, Skin Respiration, Skin pH, Skin Sensitivity, Cosmetic Application: Efficacy of Cosmetic Preparations, Safety of Cosmetic Preparations.

KOZ 515 Formulation Processes of Cosmetic Preparation 3+0 7,5
Cosmetic Multiple-Emulsion Formulations, Cosmetic Microemulsions, Cosmetic Solid Lipid Nanoparticle Systems, Sunscreening Preparations, Cosmeceutical Preparations, Practical Examples, Formulation Exercises According to Thesis Subject, Selection of Raw Materials for Cosmetic Preparations, Selection of Excipients for Cosmetic Preparations, Determination of Specifications, Pre-formulation of Cosmetic Preparations, Determination of Formulation Parameters.

KOZ 517 Characterization of Cosmetic Preparations 3+0 7,5
Particle and Globule Size Analyses of Cosmetic Preparations, pH Measurement of Cosmetic Preparations, Zeta Potential Measurement of Cosmetic Preparations, Rheological Analysis of Cosmetic Preparations,

Centrifugation of Cosmetic Preparations, DSC in Cosmetic Preparations, IR in Cosmetic Preparations, XRD in Cosmetic Preparations, NMR in Cosmetic Preparations, Stability Tests and Their Interpretation.

KOZ 518 Licensing of Cosmetic Products 2+0 6,0
Laws and Regulations on Cosmetics in Turkey; Information Provided on Inner and Outer Packing; File and Report Preparation; Stages of Questioning the Components of Cosmetic Products; Principles for the Control of Cosmetic Products; Responsibilities of Cosmetic Product Manufacturers; Cosmetic Products Notification Procedures: Data input, Creation and delivery of the notification form, Follow-up of procedures; Evaluation of Export Certificate Applications.

KOZ 790 Thesis 0+1 30,0

SBE 510 Ethics of Science and Research Techniques 2+0 7,5
Philosophy, Science and Research: Research in health sciences, Scientific resources, Experimental design and planning, Data accumulation and mining, Qualitative and quantitative research; Scientific Presentation and Dissemination; Scientific Research Ethics: Principles of research ethics; Ethic Principles and Application Fields: Ethics in definition and theory, Philosophy of research ethics; Publication Ethics of Scientific Productions: Ethics and law, Intellectual property rights, Scientific falsifications, Ethical violations.

UBE 701 Research in Area of Specialization 3+0 4,5

UBE 702 Research in Area of Specialization 3+0 4,5

UBE 901 Research in Area of Specialization 5+0 7,5

UBE 902 Research in Area of Specialization 5+0 7,5

UBİ 701 Research in Area of Specialization 3+0 4,5

UBİ 702 Research in Area of Specialization 3+0 4,5

UBK 901 Research in Area of Specialization 5+0 7,5

UBK 902 Research in Area of Specialization 5+0 7,5

UDK 701 Research in Area of Specialization 3+0 4,5

UDK 702 Research in Area of Specialization 3+0 4,5

UDK 901 Research in Area of Specialization 5+0 7,5

UDK 902 Research in Area of Specialization 5+0 7,5

UFB 701 Research in Area of Specialization 3+0 4,5

UFB 702 Research in Area of Specialization 3+0 4,5

UFB 901 Research in Area of Specialization 5+0 7,5

UFB 902 Research in Area of Specialization 5+0 7,5

UFG 701 Research in Area of Specialization 3+0 4,5

UFG 702 Research in Area of Specialization 3+0 4,5

UFG 901 Research in Area of Specialization 5+0 7,5

UFG 902 Research in Area of Specialization 5+0 7,5

UFK 701 Research in Area of Specialization 3+0 4,5

UFK 702 Research in Area of Specialization 3+0 4,5

UFK 901 Research in Area of Specialization 5+0 7,5

UFK 902 Research in Area of Specialization 5+0 7,5

UFL 701 Research in Area of Specialization 3+0 4,5

UFL 702 Research in Area of Specialization 3+0 4,5

UFL 901 Research in Area of Specialization 5+0 7,5

UFL 902 Research in Area of Specialization 5+0 7,5

UFM 701 Research in Area of Specialization 3+0 4,5

UFM 702 Research in Area of Specialization 3+0 4,5

UFS 701 Research in Area of Specialization 3+0 4,5

UFS 702 Research in Area of Specialization 3+0 4,5

UFT 701 Research in Area of Specialization 3+0 4,5

UFT 702 Research in Area of Specialization 3+0 4,5

UFT 901 Research in Area of Specialization 5+0 7,5

UFT 902 Research in Area of Specialization 5+0 7,5

UKİ 701 Research in Area of Specialization 3+0 4,5

UKİ 702 Research in Area of Specialization 3+0 4,5

UKİ 901 Research in Area of Specialization 5+0 7,5

UKİ 902 Research in Area of Specialization 5+0 7,5