

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4138	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Elektrokimya							
Course Name (English)	Electrochemistry							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To provide a better understanding of stereochemistry, especially its dynamic aspects.			
Course Outline	Basic principles of electrochemical reactions and oxidation-reduction reactions to learn electrochemical laws and their application in chemical reactions and chemical analyses to inform students about the applications..			
Textbook/ Material / Resources	A.J. Bard, Electrochemical Methods, Fundamentals and Applications, John Wiley, Newyork, 1980. J.O. Bocris " Modern Electrochemistry" Vol. 2, Rosenta ed.. 1977.			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Ankara Üniversitesi	Chemistry	Electrochemistry	Ankara Üniversitesi	Kimya
Gazi Üniversitesi	Chemistry	Electrochemistry	Gazi Üniversitesi	Kimya
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Sinan SAYDAM,				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			İmza	
Prof. Dr. Ayşegül YAZICI, Prof. Dr Memet ŞEKERCİ, Doç. Dr. Kenan KORAN				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

1. Identify natural products
2. Identify unknown steroids using spectroscopic techniques
3. Predict the spectrum of steroids given their structures

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

Face to face presentation, blackboard presentation, powerpoint presentations

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of

the course will be specified. Proof documents must be attached to this form.)		
Stakeholder Name		Opinion (It should be given as a summary, it should not exceed two lines.)
Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	History and basic concepts of electrochemistry	
2	Electrochemical cell and cell potential	
3	Galvanic cell, electrolysis	
4	Electrochemistry and Nesnst Equation	
5	Standard electrodes	
6	Electrochemical batteries and battery potentials	
7	Mid-term Examination	
8	Electrochemical batteries and battery types	
9	Various methods of electrochemical analyses	
10	Potentiometric measurement applications and pH	
11	Potentiometric and amperometric measurement methods and applications	
12	Electrolysis and industrial applications	
13	Electrochemical synthesis	
	Electrochemical corrosion and measurement	
15	Final Test	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
Sum:			100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	3	3
Self-Study (including pre-class and exam preparation)	3	18	54
Make-up Exam	1	3	3
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	3	3
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	10	2	20
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			111
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Know and apply basic electrochemistry concepts	5	4	4	4	3	5	5	3	3	3	4
2	Recognise oxidation and reduction products occurring at the cathode and anode	5	4	5	4	3	4	4	4	3	4	3
3	can write a diagram of oxidation and reduction reaction and can write the reaction of a written diagram	4	4	5	4	3	4	4	3	5	3	3

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4164	0	4	0	2	3	C	TR	4/SPRING
Course Name (Turkish)	Biyokimya Laboratuvarı							
Course Name (English)	Biochemistry Laboratory							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To perform determinations of fat, hemoglobin, carbohydrate, amino acid, protein, element, urea, uric acid, vitamin and enzyme activity			
Course Outline	<i>To perform qualitative and quantitative analyses of acidity and saturation in fats, hemoglobin and carbohydrate recognition, determination of amino acids and proteins, enzyme activity, element, urea and uric acid and vitamins</i>			
Textbook/ Material / Resources	Biochemistry Laboratory experiment notes - Fikret KARATAŞ Biochemistry – M. Engin GOZÜKARA			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Ege University	Chemistry	Biochemistry Laboratory	3-1-2-0-7	C
Yıldız teknik University	Chemistry	Biochemistry Laboratory	3-2-4-0-5	C
Eskişehir Osmangazi University	Chemistry	Biochemistry Laboratory	3-0-3-0-5	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Fikret KARATAŞ				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Prof. Dr. Fikret KARATAŞ				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1		Introduction to the laboratory and preliminary preparations,
2		Determination of acid number, iodine number and glycerin presence in oils,
3		Determination of hemoglobin and synthesis of xanthoprotein,
4		Formation of Osazone in monosaccharides, Orcin (Bial) test, Molisch test,
5		Determination of glucose and Selivanof test,
6		Determination of total protein,
7		Determination of albumin and separation of casein in milk,
8		Determination of amylase,
9		MIDTERM EXAM
10		Determination of Na, K and Ca in blood serum,
11		Determination of uric acid,
12		Determination of urea,
13		HPLC analysis of vitamins
14		Continuation of HPLC analysis of vitamins
15		FINAL

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	30
	Quizzes	12	30
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	40
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	1	10	10
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)			
Homework			
Final Exam Practice	1	2	2
Laboratory	14	4	56
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz	1	12	12
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			84
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			3

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Acquiring theoretical knowledge, data collection	5	4	3	3	4	4	4	4	3	5	1
2	To provide students with information, data collection and information about Biochemistry experiments	4	4	4	3	4	4	3	3	3	3	1
3	To develop students' skills in preparing	4	2	4	4	3	3	5	4	4	4	2

	reagents and solutions											
4	To provide students with the skills to set up different experimental sets	5	5	3	3	3	2	3	1	5	4	1
5	To provide students with the skills to interpret experimental results and use different instrumental methods	3	5	4	4	4	2	3	4	2	2	1

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4158	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Türk Kimya Endüstrileri							
Course Name (English)	Türk Chemical Industries							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	Provides intermediate level information about the industries in the course content.			
Course Outline	Turkish Metallurgical Industries, Petroleum and its products, Fertilizers and phosphates, Detergents and soaps, Cement and Other Industries.			
Textbook/ Material / Resources	Riegel's Industrial Chemistry, Chemical Process Industries I and II			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Ankara University	Chemistry	Industrial Chemistry-1/2	3-0-0-3;6	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Memet ŞEKERCİ				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Prof. Dr. Sinan SAYDAM, Prof. Dr. Ayşegül YAZICI, Doç. Dr. Kenan KORAN				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
Since it is one of the courses in the basic and applied fields of chemistry, knowledge is necessary in education and further academic education.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course will be continued theoretically in a classroom environment with relevant visual and presentation explanations.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)		
Stakeholder Name		Opinion (It should be given as a summary, it should not exceed two lines.)
Weekly Course Content Distribution		
Week	Theory	Application/Laboratory

1	Metallurgical Industries of Türkiye	
2	Metallurgical Industries of Turkey	
3	Petroleum and its products	
4	Petroleum and its products	
5	Petroleum and its products	
6	Fertilizers and phosphates	
7	Fertilizers and phosphates	
8	Metallurgical Industries of Türkiye	
9	MIDTERM EXAM	
10	Fertilizers and phosphates	
11	Detergents and soap	
12		
13	Detergents and soap	
14	Cement and Other industries	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	
	Engineering Sciences	50
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork	1	2	2

Midterm Exam Application	10	1	10
Self-Study (including pre-class and exam preparation)	1	2	2
Make-up Exam			
Experiment and Observation	14	2	28
Class Participation (Theory)			
Homework	1	2	2
Final Exam Practice			
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance	15	2	30
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	14	2	28
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			102
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Knows the importance of industry.	4	2	-	-	-	3	-	2	5	3	-
2	Knows the contribution of production to the development of the country.	4	2	-	-	-	3	-	2	5	3	-
3	Can follow all stages of production in industry.	4	2	-	-	-	3	-	2	5	3	-
4	Can control and contribute to all stages of production.	4	2	-	-	-	3	-	2	5	3	-
5	Knows that the priority in development starts with being strong in industry.	4	2	-	-	-	3	-	2	5	3	-

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4162	4	0	0	4	4	C	TR	4/SPRING
Course Name (Turkish)	Biyokimya II							
Course Name (English)	Biochemistry II							

Unit/Program	Chemistry Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	To provide information about cell membrane and cell membrane transitions, DNA replication, amino acid and protein synthesis and carbohydrate, lipid and amino acid metabolisms.
Course Outline	<i>Transitions from cell membrane; DNA and RNA structures and DNA replication, RNA and protein synthesis; Glycolysis, gluconeogenesis, TCA and Kori and glyoxylate cycles, pentose phosphate pathway, oxidative phosphorylation (ETS), Glycogen metabolism; Biosynthesis of amino acids, digestion of proteins, destruction of amino acids and urea cycle; Digestion and transportation of fats, oxidation of fats, ketone bodies, synthesis of fatty acids and bile acids.</i>
Textbook/ Material / Resources	- Biochemistry – E. Edip KEHA, Ö. İrfan KÜFREYİOĞLU, Biochemistry – M. Engin GÖZÜKARA, Biochemistry – Fifth edition Jeremy M. Berg, John L. Tymoczko & Lubert Stryer, Biochemistry of Harper – R.K. Murray; D.K. Granner; P.A. Mayes; V.W. rodwell
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Ege University	Chemistry	Biochemistry II	3-1-2-0-7	C
Yıldız teknik University	Chemistry	Biochemistry II	3-2-4-0-5	C
Eskişehir Osmangazi University	Chemistry	Biochemistry II	3-0-3-0-5	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Fikret KARATAŞ				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Prof. Dr. Fikret KARATAŞ				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of

the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Cell membrane and transitions in cell membrane	
2	Biochemical Thermodynamics,	
3	DNA replication,	
4	Protein synthesis	
5	Protein and amino acid metabolism,	
6	Carbohydrate metabolism glycogenesis,	
7	Continuation of glycogenesis and glycolysis,	
8	Continuation of glycolysis,	
9	MIDTERM EXAM	
10	Carbohydrate metabolism electron transport chain,	
11	Carbohydrate metabolism pentose phosphate pathway and ketone bodies	
12	Lipid metabolism syntheses,	
13	Lipid metabolism oxidation	
14	Continuation of beta oxidation	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	

	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	3	3
Self-Study (including pre-class and exam preparation)	2	10	20
Make-up Exam	1	3	3
Experiment and Observation			
Class Participation (Theory)	14	4	56
Homework			
Final Exam Practice	1	3	3
Laboratory			
Article Review			
Writing an Article			
Reading	10	1	10
Case Study			
Performance			
Problem Solution	14	1	14
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			109
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

Learning Outcomes (LO) (Course Outcomes)	Program Outcomes (PO)										
	1	2	3	4	5	6	7	8	9	10	11

1	To make students understand the cell membrane and the transitions in the cell membrane	5	4	3	4	4	4	3	3	2	1	1
2	To inform students about DNA replication and protein synthesis	1	2	2	3	3	3	2	2	2	3	1
3	To make students understand amino acid and protein metabolisms, Carbohydrate metabolism with all its cycles	3	3	4	3	5	2	1	1	2	2	2
4	To explain the pathways in carbohydrate metabolism and energy production and the synthesis of fatty acids	4	3	3	3	3	2	2	4	3	2	1
5	To make students understand the oxidation of fatty acids and bile acids	4	4	3	3	2	3	2	4	5	3	1

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4160	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Biyoteknoloji							
Course Name (English)	Biotechnology							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To provide information about Biotechnology, an interdisciplinary branch of science.			
Course Outline	Fundamentals of Biotechnology.			
Textbook/ Material / Resources	-TELEFONCU, A. Biotechnology, IZMİR, 1995.			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Ege University	Chemistry	Biotechnology	2-0-0-4-5	C
Selçuk University	Chemistry	Biotechnology	4-0-0-3-4	C
Ankara University	Chemistry	Biotechnology	2-0-0-3-5	E
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Mustafa KARATEPE				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
To draw attention to biotechnological production types and gains by giving general information about biotechnology.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course is aimed at gaining theoretical knowledge.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Definition and importance of biotechnology, history and development	
2	Related areas, economic importance, situation in our country and the world,	
3	Basic principles of biotechnology	
4	Technically important microorganisms, metabolism of microorganisms, plant and animal cell cultures	
5	Technical principles of fermentation,	
6	Basic processes in fermentation	
7	Biotechnological processes,	
8	Microbial biomass production	
9	MIDTERM EXAM	
10	Fermentations	
11	Biotransformations	
12	Enzyme production	
13	Environmental biotechnology	
14	Microbial leaching	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	80
	Engineering Sciences	10
	Social Sciences	
	Health Sciences	10
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	1	1
Self-Study (including pre-class and exam preparation)	3	10	30
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	10	2	20
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading	5	2	10
Case Study			
Performance			
Problem Solution	5	2	10
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	10	2	20
Application/Practice			
Other			
TOTAL WORKLOAD:			95
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Ability to apply basic knowledge of Chemistry, Mathematics and Physics to Chemistry problems	5	4	5	3	3	5	3	4	5	2	1
2	Consciousness of constantly renewing oneself and developing research skills in order to adapt to innovations and developing technology	4	4	4	5	4	3	3	2	2	3	1

3	Sensitivity to national and international effects on health, safety and the environment in chemical applications and in solving problems in the field of Chemistry	5	4	5	3	2	4	4	5	3	2	1
4	Awareness of professional and ethical responsibility	3	5	5	4	4	5	3	3	4	5	1
5	Quality and environmental awareness	5	4	3	4	4	4	5	5	5	2	1

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4126	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Nanoteknoloji							
Course Name (English)	Nanotechnology							

Unit/Program	Chemistry Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	The aim of this course is to explain the basic principles of Nanoscience and to provide a general view of the field of Nanotechnology.
Course Outline	The course content covers nano-sized materials; synthesis of nanomaterials with chemical, physical and biological methods; characterization of nanomaterials; interdisciplinary approach in nanotechnology; nano-sized production;
Textbook/ Material / Resources	- Siegel R.W., Hu E., and Roco M.C., Nanostructure Science and Technology: R&D Status and Trends in Nanoparticles, Nanostructured Materials and Nanodevices, Kluwer Academic Publishers, Dordrecht, 2000. - Nanoscience and Nanotechnology Ş.Erkoç 2011 ODTÜ Publishing (Development Foundation)
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Hacettepe University	Nanotechnology and Nanomedicine	Nanoscience and Nanotechnology	3-0-0-3;9	C
Ankara University	Chemical Engineering	Introduction to Nanotechnology	3-0-0-3;5	E
Marmara University	Mechanical Engineering	Nanotechnology and its Applications	3-0-0-4;4	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Dr. Öğr. Üyesi Mehmet Fatih COŞKUN				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Doç. Dr. Mustafa Ersin PEKDEMİR				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
To have sufficient knowledge in areas related to the field of chemistry and to examine the relationship between these areas and one's own field and to find common points.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course will proceed in the form of theoretical explanation.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)		
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)	
Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Introduction, Historical development: Top-down micro and nanotechnology	
2	What is nanotechnology?	
3	Nanotechnology as an interdisciplinary tool	
4	Nanomaterials and their properties at nanoscale	
5	Physical and chemical behaviors at nanoscale	
6	Synthesis Methods of Nanomaterials	
7	Characterization Methods of Nanomaterials	
8	Sol-gel Method, Electrospinning Method	
9	MIDTERM EXAM	
10	Synthesis of Different Types of Nanoparticles (Hydroxyapatites)	
11	Relationship Between Polymer and Nanotechnology	
12	Synthesis of Polymer-Containing Nanocomposites	
13	Graphene-Based Polymeric Nanocomposites	
14	Applications of Nanostructures in Energy Storage and Renewable Energy Systems	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:	100	
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	60
	Engineering Sciences	40
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	3	1
Self-Study (including pre-class and exam preparation)	10	1	10
Make-up Exam	1	1	1
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	1	1
Laboratory			
Article Review			
Writing an Article			
Reading	10	2	20
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	10	3	30
Application/Practice			
Other			
TOTAL WORKLOAD:			91
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
		1	2	3	4	5	6	7	8	9	10	11
Learning Outcomes (LO) (Course Outcomes)												
1	Learning the historical development of Nanotechnology and discussing its future	3	2	4	4	3	2	2	4	5	4	1
2	Understand the terms nanotechnology and	3	2	4	4	3	2	2	4	5	4	1

	nanoscience											
3	Learn about the Synthesis and Applications of Nanomaterials	4	5	5	4	5	5	4	4	4	5	1
4	Learn the analysis and characterization techniques of nanoscale materials	4	5	5	4	5	5	4	4	4	5	1
5	Understand the relationship between polymer and nano (Nanocomposite)	5	4	3	4	3	2	4	4	5	5	3

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4128	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Toksikoloji							
Course Name (English)	Toxicology							

Unit/Program	Chemistry Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	To provide information about basic concepts related to toxicology, poisons, entry into the body, toxicological effects of chemical substances.
Course Outline	Basic information about the importance of toxicology in terms of health and chemistry.
Textbook/ Material / Resources	- ERDEM O. Basic Toxicology, Nobel Medical Bookstores, 2021.
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Selçuk University	Chemistry	Toxicology	3-0-0-3-5	E
Marmara University	Pharmacy	General Toxicology	2-0-0-2-3	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Mustafa KARATEPE				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
To provide information about toxic substances and their effects on human health.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course is aimed at gaining theoretical knowledge.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Introduction to toxicology (definition, history, classification).	
2	Basic concepts	
3	Dose, Toxic dose, LD50	
4	Routes of entry, absorption, distribution, metabolism and excretion of poisons	
5	Mechanisms of toxic effects	
6	Categorization of toxic substance exposure	
7	Chemicals frequently exposed in the workplace 1	
8	Chemicals frequently exposed in the workplace 2	
9	MIDTERM EXAM	
10	Introduction to Systemic Toxicology, Central Nervous System Poisons. Liver Poisons	
11	Immunotoxicology	
12	Drug Toxicity	
13	Important Toxic Substances and Pesticides in Our Environment	
14	Approach to Poisonings	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	60
	Engineering Sciences	
	Social Sciences	
	Health Sciences	40
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork	1	1	1
Midterm Exam Application	3	10	30
Self-Study (including pre-class and exam preparation)	1	2	2
Make-up Exam			
Experiment and Observation	10	2	20
Class Participation (Theory)			
Homework	1	2	2
Final Exam Practice			
Laboratory			
Article Review			
Writing an Article	5	2	10
Reading			
Case Study			
Performance	5	1	5
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	10	2	20
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			90
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Ability to apply basic knowledge of Chemistry, Mathematics and Physics to Chemistry problems	4	1	3	4	5	5	4	4	3	4	1
2	Consciousness of constantly renewing oneself and developing research skills in order to adapt	5	4	4	5	5	4	2	3	5	4	1

	to innovations and developing technology											
3	Sensitivity to national and international effects on health, safety and the environment in chemical applications and in solving problems in the field of Chemistry	4	5	5	4	5	3	3	5	2	2	1
4	Awareness of professional and ethical responsibility	5	4	3	4	4	5	3	5	2	2	1
5	Quality and environmental awareness	5	2	5	3	3	5	4	2	2	2	1

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4138	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Stereokimya							
Course Name (English)	Stereochemistry							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To provide a better understanding of stereochemistry, especially its dynamic aspects.			
Course Outline	Isomerization reactions of chiral compounds and experimental and computational methods used in asymmetric synthesis will be discussed. Selected scientific articles from the best journals of the recent literature will be analyzed.			
Textbook/ Material / Resources	Translation from Organic Chemistry, 11th Edition by Graham Solomons, Craig Fryhle, Scott Snyder, 2016			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Marmara University	Chemistry	Stereochemistry	2-0-0-2-3	C
Marmara University	Science	Advanced Stereo Chemistry	3-0-0-3-8	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Doç. Dr. Demet COŞKUN				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			İmza	
Prof. Dr. Süleyman SERVİ				
Prof. Dr. Ahmet CANSIZ				
Prof. Dr. Hülya TUNCER				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
1. Identify natural products 2. Identify unknown steroids using spectroscopic techniques 3. Predict the spectrum of steroids given their structures

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
Face to face presentation, blackboard presentation, powerpoint presentations

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Natural products, classification of natural products	
2	Review of stereochemistry concepts	
3	Isomerism, Isomeric Relationship, Topicity (enantiotopic, diastereotopic)	
4	Classification of Isomerization Reactions of Chiral Compounds	
5	Racemization, enantiomerization, diastereomerization	
6	Atropisomerization	
7	Pharmacological and Pharmacokinetic Importance of Racemization	
8	Article review	
9	MIDTERM EXAM	
10	Stereodescriptors, D/L, R/S, E/Z.	
11	Stereo descriptors, M/P, pro-R/pro-S, Re/Si	
12	Principles of Asymmetric Synthesis and Classification of Asymmetric Reactions	
13	Asymmetric Induction	
	Control of Molecular Orientation and Conformation	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	

	Design Information	
--	--------------------	--

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	1	10	10
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading	10	1	10
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	1	7	7
Application/Practice			
Other			
TOTAL WORKLOAD:			65
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			2

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Knows and can apply basic electrochemistry concepts	5	4	4	3	2	1	3	4	3	4	1
2	Can recognize oxidation and reduction products formed at cathode and anode	4	5	2	3	2	2	5	4	1	3	2
3	Can write a scheme for oxidation and reduction reactions and can write the reaction of a scheme that has been written	4	3	3	2	3	2	4	2	3	1	2
4	Has knowledge of electrochemical analysis methods.	4	2	3	3	3	4	1	3	3	4	2
5	Can diagnose, analyze electrochemistry	5	4	2	4	2	3	2	1	2	2	2

[illegible]

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4150	0	2	0	1	2	C	TR	4/SPRING
Course Name (Turkish)	Bitirme Ödevi							
Course Name (English)	Final Project							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	This course aims to develop the practical knowledge, skills and experiences of the students of the Chemistry department, to develop their skills in applying the theoretical knowledge learned during the undergraduate education in Chemistry, and to provide experience in conducting individual experimental studies on a planned research topic, interpreting the results obtained and presenting them in a scientific report.			
Course Outline	The course covers the stages of choosing a research topic in the field of Chemistry, conducting experimental studies after conducting literature research on the subject, evaluating the obtained data and presenting the results in a report.			
Textbook/ Material / Resources	Chemistry Textbooks, Experimental Organic Chemistry, Laboratory handouts, Library infrastructure.			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Afyon Kocatepe University	Chemistry	Final Project	0-2-0-1; 3	C
Erciyes Menderes University	Chemistry	Final Project	0-2-0-1; 3	C
Bursa Uludağ University	Chemistry	Final Project	0-2-0-1; 4	C
Trakya University	Chemistry	Final Project	0-2-0-1; 4	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Hülya TUNCER				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			İmza	
Chemistry Department Faculty Members				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
The graduation project study provides students with the skills to conduct literature searches on selected study topics individually and in groups, to establish the theoretical background on the subject, to determine the experimental study conditions and prepare the experimental setups for the sound conduct of the research subject, to evaluate the results obtained from the studies and to present them in the form of a scientific report/thesis.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The graduation project course will be carried out practically in the laboratory after the theoretical infrastructure related to the study topic has been prepared.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution

We ek	Theory	Application/ Laboratory
1	Research on ethics and ethical rules in scientific research	
2	Planning the research topic within the scope of the Graduation Project. Conducting literature searches on the subject	
3	Creating theoretical and/or laboratory infrastructure in line with literature information	
4	Determining the theoretical program and/or experimental methods related to the study topic	
5	Creating a study plan and creating a theoretical infrastructure related to the subject or conducting laboratory preliminary tests	
6	Completing preliminary tests, evaluating the feasibility of the study	
7	Conducting planned theoretical/(or) experimental studies	
8	Conducting planned theoretical/(or) experimental studies	
9	Conducting planned theoretical/(or) experimental studies	
10	Conducting planned theoretical/(or) experimental studies	
11	Evaluating the researched literature information and/or the results obtained from experimental studies	
12	Interpreting the results obtained from literature studies or experimental studies with a scientific approach	
13	Converting the results obtained from the studies into a scientific report	
15	FINAL	

Assessment

Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams		
	Quizzes		
	Assignments		
	Projects		
	Term Paper	1	50
	Laboratory		
	Other		
	Final Exam	1	50
	Sum:		100
Remarks			

Content Design and	Mathematics and Basic	100
---------------------------	-----------------------	-----

Subject Weight (%)	Sciences	
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	5	1	5
Make-up Exam	1	2	2
Experiment and Observation	5	1	5
Class Participation (Theory)			
Homework			
Final Exam Practice	1	2	2
Laboratory	14	2	28
Article Review	7	1	3
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation	1	4	4
Project Submission			
Quiz			
Report Preparation	1	2	2
Submitting Reports	1	2	2
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	5	1	5
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			60
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			2

		Program Outcomes (PO)										
		1	2	3	4	5	6	7	8	9	10	11
Learning Outcomes (LO) (Course Outcomes)												
1	Can understand and apply the basic principles of conducting research on a specific subject.	4	5	3	4	4	4	4	4	3	3	1
2	Can determine and plan the topic of the Graduation Project.	5	3	2	2	5	5	3	3	5	2	1
3	Can conduct literature research in the library and on the internet regarding the Graduation	5	5	4	5	4	3	4	3	2	1	1

	Project topic, interpret and apply literature information.											
4	Can conduct independent experiments in the laboratory, and participate in group work when necessary.	5	5	5	4	3	3	4	5	2	3	1
5	Can evaluate the findings obtained as a result of the research, convert them into a report in accordance with scientific ethical rules, and present them.	4	4	4	4	3	4	4	2	2	4	1

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4142	0	0	4	2	3	C	TR	4/SPRING
Course Name (Turkish)	Fizikokimya Laboratuvarı							
Course Name (English)	Physicochemistry Laboratory							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To enable students to apply theoretical knowledge of physical chemistry in a laboratory environment and to develop their skills in interpreting physical chemical events.			
Course Outline	Physical chemistry course topics			
Textbook/ Material / Resources	ÖZDEMİR, E, Coşkun, M. Demirelli K., 1989, Physicochemistry Laboratory Experiments ELAZIG			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
The instructor who proposed the course (Title, Name and Surname)			Signature	
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			İmza	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
It will be processed by performing experimental applications in a face-to-face laboratory environment under the supervision of relevant faculty members.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1		Freundlich Adsorpsiyon Eğrisinin Elde Edilmesi
2		Viskozluk Enerjisinin Tayini Ve Viskozite
3		Cuso4 Ün Çözeltilisinin Elektrolizi
4		Sınır Molar İletkenlik Değerinin Ölçülmesi
5		Yüzey Gerilim (Eatvas Sabiti) Ve Kritik Sıcaklığın Tayini
6		Faz Diyagramları
7		REAKSİYON HIZI Ve REAKSİYON MERTEBESİ TAYİNİ
8		MIDTERM EXAM
9		Dipol Moment
10		Amonyagın Su Ve Kloroform Arasındaki Dağılım Katsayısını İncelemek
11		Oksijen Gazının Suda Çözünürlüğünün Tayini
12		(NH4) ₂ C ₂ O ₄ 'ün Çözünürlük Entalpisinin Tayini
13		Konduktometrik Titrasyon
15		FINAL

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)

Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	1	10	10
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)			
Homework			
Final Exam Practice	1	2	2
Laboratory	14	4	56
Article Review			
Writing an Article			
Reading	1	7	7
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	1	7	7
Application/Practice			
Other			
TOTAL WORKLOAD:			86
ECTS CREDITS OF THE COURSE: <i>(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)</i>			3

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Understands how to use theoretical knowledge of physical chemistry	5	5	3	1	2	2	3	1	3	2	1
2	Develops laboratory skills	2	2	1	1	3	5	1	4	4	2	1
3	Interprets physical chemical events	5	5	4	1	4	4	4	2	3	4	3
4	Understands the experimental application of physical chemistry.	5	5	4	1	5	5	5	2	3	4	2

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4138	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Stereokimya							
Course Name (English)	Stereochemistry							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To provide a better understanding of stereochemistry, especially its dynamic aspects.			
Course Outline	Isomerization reactions of chiral compounds and experimental and computational methods used in asymmetric synthesis will be discussed. Selected scientific articles from the best journals of the recent literature will be analyzed.			
Textbook/ Material / Resources	Translation from Organic Chemistry, 11th Edition by Graham Solomons, Craig Fryhle, Scott Snyder, 2016			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Marmara University	Chemistry	Stereochemistry	2-0-0-2-3	C
Marmara University	Science	Advanced Stereo Chemistry	3-0-0-3-8	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Doç. Dr. Demet COŞKUN				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			İmza	
Prof. Dr. Süleyman SERVİ				
Prof. Dr. Ahmet CANSIZ				
Prof. Dr. Hülya TUNCER				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
1. Identify natural products 2. Identify unknown steroids using spectroscopic techniques 3. Predict the spectrum of steroids given their structures

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
Face to face presentation, blackboard presentation, powerpoint presentations

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Natural products, classification of natural products	
2	Review of stereochemistry concepts	
3	Isomerism, Isomeric Relationship, Topicity (enantiotopic, diastereotopic)	
4	Classification of Isomerization Reactions of Chiral Compounds	
5	Racemization, enantiomerization, diastereomerization	
6	Atropisomerization	
7	Pharmacological and Pharmacokinetic Importance of Racemization	
8	Article review	
9	MIDTERM EXAM	
10	Stereodescriptors, D/L, R/S, E/Z.	
11	Stereo descriptors, M/P, pro-R/pro-S, Re/Si	
12	Principles of Asymmetric Synthesis and Classification of Asymmetric Reactions	
13	Asymmetric Induction	
	Control of Molecular Orientation and Conformation	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	

	Design Information	
--	--------------------	--

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	3	3
Self-Study (including pre-class and exam preparation)	3	18	54
Make-up Exam	1	3	3
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	3	3
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	10	2	20
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			111
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Learning the dynamic aspects of stereo chemistry	5	4	4	4	3	5	5	3	3	3	4
2	Achieving the ability to conduct independent research	5	4	5	4	3	4	4	4	3	4	3
3	Achieving the ability to learn lifelong by following technological developments	4	4	5	4	3	4	4	3	5	3	3

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4112	2	0	-	2	4	E	TR	4/SPRING
Course Name (Turkish)	(İleri) Mesleki Yabancı Dil							
Course Name (English)	(Advanced) Vocational Foreign Language							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	This course aims to provide students with the skills to use professional grammar and professional terminology in the field of Chemistry. For this purpose, it is aimed to develop the students' listening-reading-understanding and discussion skills on selected English topics and texts related to Chemistry by following international literature, to teach them how to use English efficiently and effectively, and to enable them to express chemical events and processes in written and oral English sentences.			
Course Outline	A general review of basic grammar rules and sentence structures in English. Introduction to scientific topics in the field of chemistry, Introduction to basic concepts related to chemistry. Translations of scientific texts and articles in the field of chemistry			
Textbook/ Material / Resources	1. N. A. Burnham, F. L. Hutson, Scientific English as a Foreign Language, 2007. 2. Basic English for Science, Oxford University Press 1978. 3. http://www.upjs.sk/public/media/3499/English-for-Chemists.pdf 4. General Chemistry Principles and Modern Applications. Ninth Edition, Pearson International Edition. Petrucci, R.H.; Harwood, W.S.;			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Bursa Uludağ University	Chemistry	Technical English for Chemists	2-0-0-2; 2	C
Pamukkale University	Chemistry	Professional Foreign Language	2-0-0-2; 3,5	C
Yozgat Bozok University	Chemistry	Professional Foreign Language	2-0-0-2; 4	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Hülya TUNCER				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Faculty members of the Chemistry Department				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

To be able to follow and interpret academic subjects and literature in the field of chemistry; to ensure that they can express chemical events and processes in professional studies with English sentences both verbally and in writing.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

Theoretical teaching, student-focused, interactive and eclectic approach to teaching.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution

We ek	Theory	Application/ Laboratory
1	Examining English Grammar Rules and Basic Sentence Structures	
2	Academic Translation Methods	
3	Learning concepts and definitions related to chemistry. Preliminary Information on Translation of Chemistry Topics from English to Turkish	
4	A review of a selected topic in Chemistry: Matter: Properties and Measurement Methods	
5	A review of a selected topic in Chemistry: Periodic Table and Some Atomic Properties	
6	A review of a selected topic in Chemistry: Chemical Reactions and Stoichiometry	
7	A review of a selected topic in Chemistry: Solutions and Physical Properties	
8	Midterm Exam-A review of a selected topic in Chemistry: Nuclear Chemistry	
9	Selected literature reviews in Chemistry: A scientific article in organic chemistry	
10	Selected literature reviews in Chemistry: A scientific article in polymer chemistry	
11	Selected literature reviews in Chemistry: A scientific article in physical chemistry	
12	Selected literature reviews in Chemistry: A scientific article in inorganic chemistry	
13	Selected literature reviews in Chemistry: A scientific article in biochemistry	
15	FINAL	

Assessment

Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
Sum:			100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	

	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	2	10	20
Make-up Exam			3
Experiment and Observation			
Class Participation (Theory)	10	2	20
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review	5	2	10
Writing an Article			
Reading	5	2	10
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	5	2	10
Application/Practice			
Other			
TOTAL WORKLOAD:			77
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			3

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Students have professional English vocabulary in the field of Chemistry.	5	5	4	4	4	5	5	4	4	4	4
2	Students have English grammar, reading comprehension and writing skills in the field of Chemistry.	5	3	5	4	3	3	3	5	5	4	5
3	Students can read and understand scientific texts in English in the field of Chemistry.	5	5	4	4	4	3	3	5	4	4	5
4	Students have professional English knowledge necessary for business life.	5	3	3	4	4	4	3	5	4	3	5

5	Students can use English effectively for social and professional purposes related to their field.	4	5	5	3	3	2	3	4	5	3	5
---	---	---	---	---	---	---	---	---	---	---	---	---

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4122	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Hücre Ve Doku Kültürü Hazırlama Teknikleri							
Course Name (English)	Cell and Tissue Culture Preparation Techniques							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	Various technical aspects and procedures for mammalian and plant cell and tissue culture, which are important tools in many biochemical and biotechnological applications, will be examined (media, environmental conditions and facilities). Also, basic biological processes related to cell cycle and signal transduction will be examined.			
Course Outline	Cell and tissue studies, which are important parameters in the study of biological activities of chemical and biological materials.			
Textbook/ Material / Resources	- Tran Thanh Van, K. M. 1981. Control of morphogenesis in in vitro cultures. Annu. Rev. Plant Physiol.			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Selçuk University	Chemistry	Cell and Tissue Culture Preparation Techniques	3-0-0-3-5	E
Çukurova University	Faculty of Medicine	Basic Cell Culture Techniques and Analysis Methods	3-0-0-2-4	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Mustafa KARATEPE				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
To have knowledge about basic cell culture techniques and their usage areas.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course is aimed at gaining theoretical knowledge.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)
--

Stakeholder Name		Opinion (It should be given as a summary, it should not exceed two lines.)
Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1	Definition and terminology of cell and tissue culture	
2	Cell Culture Laboratory	
3	Cell Culture Laboratory Equipment	
4	Biological Contamination in Cell Culture	
5	Basic Cell Culture	
6	Types of cell culture; adherent and suspension cultures	
7	Passaging in Cell Culture	
8	Cryopreservation of cells in culture medium	
9	MIDTERM EXAM	
10	Areas of use of cell culture	
11	Immunohistochemical techniques applied in cell culture	
12	Cell viability tests	
13	Types of microscopes used in cell culture	
14	Evaluation criteria of results obtained in culture	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
		Sum:	100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	60
	Engineering Sciences	
	Social Sciences	
	Health Sciences	40
	Educational Sciences	
	Culture and Art Sciences	

	Design Information	
--	--------------------	--

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	1	1
Self-Study (including pre-class and exam preparation)	6	5	30
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	10	4	40
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading	5	1	5
Case Study			
Performance			
Problem Solution	1	1	1
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	10	2	20
Application/Practice			
Other			
TOTAL WORKLOAD:			101
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Ability to apply basic knowledge of Chemistry, Mathematics and Physics to	1	2	3	4	5	6	7	8	9	10	11

	Chemistry problems											
2	Consciousness of constantly renewing oneself and developing research skills in order to adapt to innovations and developing technology	4	5	4	5	3	5	4	4	4	4	1
3	Sensitivity to national and international effects on health, safety and the environment in chemical applications and in solving problems in the field of Chemistry	5	3	-5	5	4	4	5	3	3	2	1
4	Awareness of professional and ethical responsibility	5	4	5	5	4	5	4	4	5	5	1
5	Quality and environmental awareness	4	4	4	4	5	5	3	4	3	4	1

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4130	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Polimerik Nanomalzemeler							
Course Name (English)	Polymeric Nanomaterials							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	Providing basic information about the preparation and characterization of polymer-based nanomaterials and nanocomposites by various methods and exemplifying their areas of use.			
Course Outline	Preparation principles and characterization methods of polymer-based nanostructures, i.e. particles with a size of 100 nm and below, will be discussed. Among these, detailed information about nanogels, nanotubes, nanowires and nanocomposites will be given and examples of their areas of use will be given.			
Textbook/ Material / Resources	- C.S.S.R. Kumar (Ed.) "Polymeric Nanomaterials" Wiley, 2011. - O. Güven (Ed.) "Advanced Nanocomposites: Types, Properties and Applications" NOVA Publsners, New York, 2014.			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Hacettepe University	Chemistry	Polymeric Nanomaterials	3-0-0-0-10	C
Marmara University	Polymer Science and Technology	Nanomaterials	3-0-0-0-8	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Dr. Öğr. Üyesi Mehmet Fatih COŞKUN				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Doç. Dr. Mustafa Ersin PEKDEMİR				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
Students will be able to understand the effects of the "nanoscale". Students will be able to learn about nanostructures. Students will be able to follow nanotechnology. Students will be able to understand the basics of characterization methods. Students will be able to investigate nanostructures and nanostructure-based devices.
Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
Face-to-face lecture, discussion, question and answer.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	What is nanotechnology? History and importance of nanotechnology	
2	Synthesis of nanomaterials I	
3	Synthesis of nanomaterials II	
4	Synthesis of nanomaterials III	
5	Characterization of nanomaterials I	
6	Characterization of nanomaterials II	
7	Applications of nanomaterials	
8	Magnetic nanoparticles	
9	MIDTERM EXAM	
10	Carbon nanotubes	
11	Silica, alumina, iron oxide and some other (ZnO, TiO2, CeO2 etc.) nanoparticles	
12	Gold and silver nanoparticles	
13	Graphene	
14	Preparation of polymer thin films by layer-by-layer coating	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
		Sum:	100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	3	3
Self-Study (including pre-class and exam preparation)	2	18	36
Make-up Exam	1	3	3
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	3	3
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	2	2	4
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	10	2	20
Application/Practice			
Other			
TOTAL WORKLOAD:			97
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Learning the application areas of polymer nanocomposites	5	4	4	4	3	5	5	3	3	3	4
2	Gaining the ability to conduct independent research	5	4	5	4	3	4	4	4	3	4	3
3	Gaining the ability to learn lifelong by following technological developments	4	4	5	4	3	4	4	3	5	3	3

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM 4132	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Boyarmadde Kimyası							
Course Name (English)	Dyestuff Chemistry							

Unit/Program	Chemistry Department/Undergraduate Program					
Course Prerequisite	No					
Course Objectives	To provide information about dyes and their properties.					
Course Outline	<i>Dyes, solvents, pigments and industrial paints</i>					
Textbook/ Material / Resources	Science and Technology Surface Coating, B.N. Chapman, 1974 Surface Coating Technology, D.H. Parker 1965 Powder Coating Technology, M.H. Ranney, 1975 Shreve Chemistry, R.N. Norris, 1978 İ. Başer, Y. İnancı, Marmara University Publications Publication No: 482, Technical Education Faculty publication no: 2.					
Internship Status	No					
Course Precedents						
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type		
Marmara University	Chemistry	Dyestuff and Dyeing Technique	2-0-0-2-3	C		
Anadolu University	Chemistry	Dyestuff Chemistry	2-0-0-2-3	E		
Pamukkale University	Chemistry	Dyestuffs	2-0-0-2-3,5	E		
The instructor who proposed the course (Title, Name and Surname)			Signature			
Doç. Dr. Demet COŞKUN						
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature			
Prof. Dr. Hülya TUNCER						
Prof. Dr. Süleyman SERVİ						
Prof. Dr. Ahmet CANSIZ						

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

To state definitions such as dyestuff, color, fiber and to show examples of these. To state dyestuff classes, their production and areas of use.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

Face to face presentation, blackboard presentation, powerpoint presentations

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	Opinion (It should be given as a summary, it should not
-------------------------	--

	exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	History of Dyestuffs	
2	General Properties of Dyestuffs	
3	Classification and Chemical Properties of Fiber Types	
4	Classification of Dyestuffs as Organic and Inorganic Dyestuffs	
5	Chemical and Physical Properties of Dyestuffs	
6	Colorants	
7	Obtainment of Inorganic Dyestuffs	
8	Obtainment of Inorganic Dyestuffs	
9	MIDTERM EXAM	
10	Production of Organic Dyes	
11	Production of Organic Dyes	
12	Azo Dyes	
13	Azo Dyes	
14	Lattice Structure in Metals	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	

	Design Information	
--	--------------------	--

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	3	3
Self-Study (including pre-class and exam preparation)	3	18	54
Make-up Exam	1	3	3
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	3	3
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	2	2	4
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	10	1	10
Application/Practice			
Other			
TOTAL WORKLOAD:			105
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Learning the types of dyes and their application areas	5	4	4	4	3	5	5	3	3	3	4
2	Gaining the ability to conduct independent research	5	4	5	4	3	4	4	4	3	4	3
3	Gaining the ability to learn lifelong by following technological developments	4	4	5	4	3	4	4	3	5	3	3

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4134	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Tekstil Kimyası							
Course Name (English)	Textile Chemistry							

Unit/Program	Chemistry Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	Introducing students to natural and synthetic fibers; teaching the production methods of natural and synthetic fibers; providing information about weaving; teaching fiber analysis methods.
Course Outline	
Textbook/ Material / Resources	
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Pamukkale University	Chemistry	Textile Chemistry	2-0-0-?-3	E
Yıldız teknik University	Chemistry	Textile Chemistry	3-0-0-3-5	E
İstanbul University	Chemistry	Textile Chemistry	2-0-2-3-4	E
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Ayşegül YAZICI				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Prof. Dr. Mehmet ŞEKERCİ, Doç. Dr. Kenan KORAN				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/ Laboratory
1	Introduction, Meaning and history of textile	
2	Development of fiber chemistry	
3	Chemical fiber types, raw materials and methods of production	
4	Properties of polyester fibers (geometrically, physically and chemically)	
5	Properties of polyamide fibers (geometrically, physically and chemically)	
6	Polyacrylonitrile fibers, their properties and areas of use	
7	fiber drawing techniques	
8	Artificial fiber industry in Turkey	
9	MIDTERM EXAM	
10	Natural fibers (inorganic and organic fibers)	
11	Natural fibers (inorganic and organic fibers)	
12	Semi-synthetic fibers	
13	Fiber analysis	
14	Natural fibers (inorganic and organic fibers)	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork	1	2	2
Midterm Exam Application	3	15	45
Self-Study (including pre-class and exam preparation)	1	2	2
Make-up Exam			
Experiment and Observation	14	2	28
Class Participation (Theory)			
Homework	1	2	2
Final Exam Practice			
Laboratory			
Article Review			
Writing an Article	5	1	5
Reading			
Case Study			
Performance			
Problem Solution			
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work	10	1	10
Argument			
Application/Practice			
Other			
TOTAL WORKLOAD:			94
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	By providing basic information about textile chemistry, it understands the importance of chemistry in the textile sector.	4	5	4	5	4	3	5	2	2	5	4
2	Students learn about textile raw materials.	5	5	4	3	2	2	2	3	4	4	5
3	Students gain lifelong learning skills and use	4	5	2	3	5	4	4	5	3	2	4

	their knowledge related to their field in daily life.											
4	They identify problems in basic and applied fields, collect data, develop hypotheses for the solution of the problem by making synthesis, solve the problem with various methods, and take quality and standard into consideration when reaching a conclusion.	4	5	5	3	3	4	2	4	4	5	4
5	Students have the ability to express themselves clearly in written form, verbally and, when necessary, in the form of visual presentation.	5	4	4	3	4	3	5	2	5	5	5

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4120	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Nükleer Kimya							
Course Name (English)	Nuclear Chemistry							

Unit/Program	Chemistry Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	To gain knowledge about the basic concepts of nuclear chemistry, the events that occur in the atomic nucleus and their effects.
Course Outline	Atomic nucleus, nuclear reactions and their laws
Textbook/ Material / Resources	Ali Rıza Berkem, Nuclear Chemistry, I.U. Publications Cemil Şenvar, Atom, Molecule and Nucleus, Hacettepe University Publications,1982.
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Izmir Institute of Technology	Chemistry	Introduction to Nuclear Chemistry	3-0-0-3-5	C
Sakarya University	Chemistry	Nuclear Chemistry	2-0-0-2-5	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Memet ŞEKERCİ				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Prof. Dr. Sinan SAYDAM, Prof. Dr. Ayşegül YAZICI, Doç. Dr. Kenan KORAN				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
Since chemistry is one of the most important fields for our country, knowledge is necessary in education and further academic training.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course will be continued theoretically in a classroom environment with relevant visual and presentation explanations.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1	Types and properties of nuclear radiation	
2	Types and properties of nuclear radiation	
3	Disintegration law	
4	Units of radioactivity	
5	Radioactive series	
6	Internucleon forces	
7	Nuclear reactions and their energies	
8	Transformation Reactions	
9	MIDTERM EXAM	
10	Transformation Reactions	
11	Artificial radioactivity	
12	Artificial radioactivity	
13	Nuclear fission reactions and nuclear energy	
14	Nuclear fission reactions and nuclear energy	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation

Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)			
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading	10	1	
Case Study			
Performance			
Problem Solution	14	2	28
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	14	2	28
Application/Practice			
Other			
TOTAL WORKLOAD:			90
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Knows what radiation is	4	2	-	-	-	3	-	2	5	3	-
2	Knows the areas where radiation is used and its dangers	4	2	-	-	-	3	-	2	5	3	-
3	Knows the benefits and harms of nuclear energy.	4	2	-	-	-	3	-	2	5	3	-
4	Understands and explains the importance of Turkey's Nuclear studies.	4	2	-	-	-	3	-	2	5	3	-
5	Knows the importance of Fission and Fusion	4	2	-	-	-	3	-	2	5	3	-

[illegible]

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4136	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Katı Hal Kimyası							
Course Name (English)	Solid State Chemistry							

Unit/Program	Chemistry Department/Undergraduate Program
Course Prerequisite	No
Course Objectives	The main objective of the course is to examine the properties of solid phases, which are condensed states of matter, and to provide information about the techniques that can be used in their characterization.
Course Outline	<i>Introduction to solid state chemistry, classification of states of matter, definition and types of crystal, solid phase reactions and preparation methods of solids, Crystallization Techniques - Crystallization of solutions, melts and gels, growth of single crystals, Unit Cell Concept and Parameters, Investigation of phase transformations, Miller Indices, Crystal Systems, Bravais Cells, Symmetry Elements and Point Groups in Crystals, Metallic Crystals, Common Crystal Types for Ionic Solids, Lattice Structure in Metals, Crystal defects and deviations from stoichiometry, Methods used in characterization of inorganic solids, Methods used in characterization of inorganic solids, Electronic structure of crystals, Electronic, magnetic properties of inorganic solids, Optical properties of inorganic solids</i>
Textbook/ Material / Resources	Advanced Inorganic Chemistry Lecture Notes 2. Advance Inorganic Chemistry, F.A. Cotton. Saim Özkâr, Namık Kemal Tunali, Inorganic Chemistry Textbook, Gazi Bookstore, 2017. Turgut Gündüz, Coordination Chemistry Textbook, Gazi Bookstore, 2005.
Internship Status	No

Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Marmara University	Chemistry	Solid State Chemistry	2-0-0-2-3	C
Izmir Institute of Technology	Chemistry	Introduction to Solid State Chemistry	3-0-0-3-5	C
Sakarya University	Chemistry	Solid State Chemistry	2-0-0-2-5	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Memet ŞEKERCİ				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	
Prof. Dr. Sinan SAYDAM, Prof. Dr. Ayşegül YAZICI, Doç. Dr. Kenan KORAN				

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
Since it is one of the courses in the basic and applied fields of chemistry, knowledge is necessary in education and further academic education.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
The course will be continued theoretically in a classroom environment with relevant visual and presentation explanations.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business

world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution

Week	Theory	Application/ Laboratory
1	Introduction to Solid State Chemistry, Classification of States of Matter, Definition and Types of Crystals, Solid Phase Reactions and Preparation Methods of Solids	
2	Crystalization Techniques - Crystallization of Solutions, Melts and Gels, Growth of Single Crystals	
3	Unit Cell Concept and Parameters	
4	Investigation of Phase Transformations	
5	Miller Indices, Crystal Systems, Bravais Cells	
6	Symmetry Elements and Point Groups in Crystals	
7	Metallic Crystals	
8	Common Crystal Types for Ionic Solids	
9	MIDTERM EXAM	
10	Lattice Structure in Metals	
11	Crystal defects and deviations from stoichiometry	
12	Methods used in characterization of inorganic solids, Methods used in characterization of inorganic solids Electronic structure of crystals, Electronic, magnetic properties of inorganic solids, Optical properties of inorganic solids	
13	Electronic structure of crystals, Electronic, magnetic properties of inorganic solids, Optical properties of inorganic solids	
14	Lattice Structure in Metals	
15	FINAL	

Assessment

Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
Sum:			100

Remarks		
Content Design and Subject Weight (%)	Mathematics and Basic Sciences	70
	Engineering Sciences	30
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	10	1	10
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	2	28
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	14	2	28
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	14	2	28
Application/Practice			
Other			
TOTAL WORKLOAD:			100
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Distinguish between Amorphous and Crystalline	4	2	-	-	-	3	-	2	5	3	-

	Structures											
2	Recognize Crystal Geometry	4	2	-	-	-	3	-	2	5	3	-
3	Determine Unit Cell Concept and Parameters	4	2	-	-	-	3	-	2	5	3	-
4	Learn Common Crystal Types for Ionic Solids	4	2	-	-	-	3	-	2	5	3	-
5	Methods used in characterization of inorganic solids	4	2	-	-	-	3	-	2	5	3	-

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
CHEM4124	2	0	0	2	4	E	TR	4/SPRING
Course Name (Turkish)	Klinik Biyokimya							
Course Name (English)	Clinical Biochemistry							

Unit/Program	Chemistry Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	To teach the tests required for diagnosis and treatment in clinical biochemistry laboratories and to have knowledge about the test parameters and related diseases studied in Clinical Biochemistry Laboratories.			
Course Outline	Definition of clinical biochemistry, basic instrumental analysis principles (spectrophotometry immunoassay), introduction of biochemical analyses performed on body materials, clinical enzymes used in the diagnosis of diseases, liver function tests, kidney function tests, specific plasma proteins, tumor markers and hematological tests.			
Textbook/ Material / Resources	- Henry's Clinical Diagnosis and Management by Laboratory Methods. - Clinical Biochemistry / Bishop, Academician Bookstore, 2016.			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Hacettepe University	Medicine	Clinical Biochemistry Laboratory Applications	2-4-0-4-10	C
Pamukkale University	Department of Medical Services and Techniques	Clinical Biochemistry - I	2-2-0-2-3	C
Yeditepe University	Pharmacy	Clinical Biochemistry	2-0-0-2-3	C
The instructor who proposed the course (Title, Name and Surname)			Signature	
Prof. Dr. Mustafa KARATEPE				
Dersi verebilecek öğretim elemanları (Unvanı, Adı ve Soyadı)			Signature	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)

To have knowledge about clinical biochemistry, which is very intertwined and important in terms of chemistry, and the parameters it deals with and their meanings.

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

The course is aimed at gaining theoretical knowledge.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1	Introduction to Clinical Biochemistry	
2	Biosafety in Clinical Laboratories	
3	Collection of Samples and Procedures	
4	Analysis performed in clinical biochemistry laboratories	
5	Analytical parameters in serum	
6	Physical properties of urine	
7	Microscopic examination of urine	
8	Total blood count tests and peripheral smear	
9	MIDTERM EXAM	
10	Coagulation and platelet function tests	
11	Hormone and tumor markers	
12	Emergency Laboratory tests	
13	Use of HPLC in clinical chemistry	
14	Tests for the diagnosis of inherited metabolic diseases	
15	FINAL	

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

Content Design and Subject Weight (%)	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	

	Design Information	
--	--------------------	--

Workload (ECTS) Calculation			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	1	1
Self-Study (including pre-class and exam preparation)	2	10	20
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	10	2	20
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading	10	2	20
Case Study			
Performance			
Problem Solution	5	1	5
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument	10	2	20
Application/Practice			
Other			
TOTAL WORKLOAD:			90
ECTS CREDITS OF THE COURSE: (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			4

		Program Outcomes (PO)										
Learning Outcomes (LO) (Course Outcomes)		1	2	3	4	5	6	7	8	9	10	11
1	Ability to apply basic knowledge of Chemistry, Mathematics and Physics to	5	4	5	3	3	5	4	5	5	3	1

	Chemistry problems											
2	Consciousness of constantly renewing oneself and developing research skills in order to adapt to innovations and developing technology	4	3	2	4	3	4	5	3	5	5	1
3	Sensitivity to national and international effects on health, safety and the environment in chemical applications and in solving problems in the field of Chemistry	5	2	4	3	4	4	5	3	5	1	1
4	Awareness of professional and ethical responsibility	4	5	5	1	2	2	5	5	5	2	1
5	Quality and environmental awareness	5	2	3	4	5	3	4	4	4	4	1