

Courses and ECTS Credits

1 th Year					
Code	Course Name	ECTS	T+P+L	Z/S	Language
Autumn Term					
	Social Selective I	1	1+0+0	S	Turkish
Autumn Term Summation:					
Spring Term					
	Social Selective II	1	1+0+0	S	Turkish
Spring Term Summation:					
1st year totally:					

2 nd Year					
Code	Course Name	AKTS	D+U+L	Z/S	Language
Autumn Term					
	Elective Course I (Alan Seçmeli I)	2	2+0+0	S	Turkish
	Elective Course I (Alan Dışı Seçmeli I)	3	2+0+0	S	Turkish
Autumn Term Summation:					
Spring Term					
	Elective Course II (Alan Seçmeli II)	2	2+0+0	S	Turkish
	Elective Course II (Alan Dışı Seçmeli II)	3	2+0+0	S	Turkish
Spring Term Summation:					
2nd year totally:					

3 th Year					
Code	Course Name	AKTS	D+U+L	Z/S	Language
Autumn Term					
	Elective Course III (Alan Seçmeli III)	7	3+0+0	S	Turkish
	Elective Course IV (Alan Seçmeli IV)	4	3+0+0	S	Turkish
Autumn Term Summation:					
Spring Term					
	Elective Course V (Alan Seçmeli V)	5	3+0+0	S	Turkish
	Elective Course VI (Alan Seçmeli VI)	4	3+0+0	S	Turkish
Spring Term Summation:					
3th year totally:					

4 th Year					
Code	Course Name	AKTS	D+U+L	Z/S	Language
Autumn Term					
	Applications of Fundamental Field	8	0+6+0	S	Turkish
	Elective Courses of Fundamental Field (AMP-SSP-...)	7	4+0+0	S	Turkish
	Elective Course (Alan Seçmeli) VII	5	3+0+0	S	Turkish
	Elective Course (Alan Seçmeli) VIII	5	3+0+0	S	Turkish
	Elective Course (Alan Seçmeli) IX	5	3+0+0	S	Turkish
Autumn Term Summation:					
Spring Term					
	Internship	30	0+0+0	Z	Turkish
Spring Term Summation:					
4th year totally:					



ESOGU Physics Department Course Information Form

COURSE CODE		COURSE NAME	FIRST AID I
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Labratory	Credit	ECTS	TYPE	LANGUAGE
1	1	0	0	0	1	COMPULSORY () ELECTIVE (X)	TURKISH

COURSE CATAGORY

Basic Science	Basic Engineering	Mechanical Engineering Profession [if it contains considerable design, mark with (√)]	Social Science
			X

ASSESSMENT CRITERIA

	Evaluation Type	Quantity	%
MID-TERM	1st Mid-Term	-	-
	2nd Mid-Term	1	40
	Quiz	-	-
	Homework	-	-
	Project	-	-
	Report	-	-
	Others (.....)	-	-
FINAL EXAM		1	60
	TOTAL	2	100

PREREQUIEITE(S)	-
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COURSE DESCRIPTION	In this course, teaches to first aid knowledge and skills which contains sick or injured person until medical help to save lives, maintain safety of the injured person.
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COURSE OBJECTIVES	This course aim is to teach first-aid knowledge and skills to healthy individuals which may experience a sudden health problems (Cardiac and respiratory arrest, bleeding, drowning, poisons, burns, fractures etc.) in their daily lives
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ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	-
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COURSE OUTCOMES	<ul style="list-style-type: none"> ❖ Identify term to first aid and first aider ❖ Identify briefly anatomy and physiology of the human body ❖ Assessment of the injured and scene of accident ❖ Perform basic life support (Cardio-pulmoner resuscitation) ❖ Know a foreign object blocking the airway by removing the object first aid procedure ❖ Know to practises of first aid in near drowning ❖ Know to practises of first aid in bleeding ❖ Know to practises of first aid in shock ❖ Know to practises of first aid in injuries ❖ Know to practises of first aid in poisons ❖ Know to practises of first aid in insect and animal to bite and stings ❖ Know to practises of first aid in burns ❖ Know to practises of first aid in heat stroke and frostbite ❖ Know to practises of first aid in fractures, dislocations and sprains ❖ Know to practises of first aid in a foreign object to eyes, nose and ears
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	❖ Know to practises of first aid in other emergencies (Fainting, Hyperglycemia, Hypoglycemia, epilepsy seizures, heart attack fever etc.)
TEXTBOOK	Erdil F, Bayraktar N, Çelik SŞ (2009) Temel İlk Yardım. Eflatun Yayınevi, Ankara.
OTHER REFERENCES	<ul style="list-style-type: none"> - Kocatürk C (2005) İlk Yardım El Kitabı. Ohan Matbaacılık, İstanbul. - Tabak S, Somyürek İ (2008) Temel İlk Yardım ve Acil Bakım. Palme Yayıncılık, Ankara. - American Heart Association Guidelines CPR and ECC (2010). http://www.heart.org/HEARTORG/CPRAndECC/Science/2010-AHA-Guidelines-for-CPR-ECC_UCM_317311_SubHomePage.jsp/
TOOLS AND EQUIPMENTS REQUIRED	Computer, Barcovision, Modals of First aid



ESOGU Physics Department Course Information Form

COURSE CODE	121311197	COURSE NAME	Physical Education I
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Labratory	Credit	ECTS	TYPE	LANGUAGE
Spring	1			0	1	COMPULSORY () ELECTIVE (x)	Turkish

COURSE CATAGORY

Basic Science	Basic Engineering	Mechanical Engineering Profession [if it contains considerable design, mark with (√)]	Social Science

ASSESSMENT CRITERIA

	Evaluation Type	Quantity	%
	MID-TERM	1st Mid-Term	1
2nd Mid-Term			
Quiz			
Homework			
Project			
Report			
Others (.....)			
FINAL EXAM		1	60

PREREQUIEITE(S)

COURSE DESCRIPTION

Physical education; running, joint and muscle groups convenient to theirs level, sport branch, basketball, volleyball, handball field measures and rules of game, sport benefits to our health; health, first aid, matches in class.

COURSE OBJECTIVES

The ability of having knowledge concerning the orders of the lecture.
The ability of running all the organs and systems to convenience of theirs level.
The ability of improving the nerve muscle and joint coordinating.
The ability of having basic knowledge, skill, manner and habits concerning physical education and sport
Take responsibility and duty, to go with leader and the ability of doing leadership
Playing amicably and competition appreciating the winner acceptance of loosing, and can be object to trick and injustice.
Having knowledge about sport, vehicle and facilities and can use this.

ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION

COURSE OUTCOMES

The ability of growing health, happy, developed aspect of physical and psychological, self confident individuals who have the sense competitioning amicably.

TEXTBOOK

Physical Education at Schools (Hikmet Aracı 1999)

OTHER REFERENCES

Basic principles in Physical Education and Sport (Yrd. Doç. Dr. Faruk Yamaner)2001

TOOLS AND EQUIPMENTS REQUIRED

COURSE SYLLABUS	
WEEK	TOPICS
1	Giving general knowledge about the subject of physical education.
2	Jogging, rotating which is softening joint and muscle groups. Giving knowledge about basic basketball rules, the matters to take care of passing and rubbing ball.
3	Jogging, warming movements, defense and offence studies at basketball.
4	Jogging, stretching movements, rubbing ball, exit to turnstile studies, attack sets at basketball.
5	Atatürk's words on sport, jogging, passing and playing short-time match in basketball playing rules.
6	Jogging, stretching movements, giving basic knowledge about basic volleyball techniques, finger pass on net and control pass studies.
7	Interval studying, stretching movements headline at volleyball, pass and service firing, return in field at volleyball.
8	What's benefit of sport our health? Stretching movements, doing match in volleyball playing rules.
9	Running athletics (short, middle, long) knowledge about distance, warming studying, short-time volleyball match.
10	Jogging, stretching movements, giving knowledge about basic handball techniques.
11	Jogging, movement for strengthening joint and muscles groups, rubbing ball and pass studies at handball.
12	Exercise for stretching and loosening the muscles, football playing rules and passing studies, short-time football match.
13	First aid at sport disability, jogging, stretching movements, marches in class.
14	Jogging, warming movements, matches in class
15,16	Jogging, stretching studies, matches in class

NO	PROGRAM OUTCOMES	3	2	1
1	Having knowledge course order and sport hall.	X		
2	The ability of strengthening all the organs and systems according to their' s convenient level.	X		
3	Improving physical skills.	X		
4	Improving nerve, muscle and joint coordinating.	X		
5	Explaining Atatürk's words on sport and sportmen	X		
6	Having basic knowledge skill, manner and habit about sport	X		
7	Playing basketball and volleyball with playing rules.	X		
8	Having comprehend the benefits of sport and can be willing to spent his/her free time to do them	X		
9	Improving physical ability and learn the means of increasing durability.	X		
10	Having basic knowledge, skill, manner and habits about sport.	X		
11	Having learned handball and football playing rules and applying them.	X		
12	Having knowledge about Olympiad.	X		
13	Learning how can be helping a sportman who is disabled.	X		
14	Having basic knowledge, skill, manner and habits, racing amicably and appreciating the winner.	X		

1:None. 2:Partially contribution. 3: Completely contribution.

Instructor(s):



COURSE CODE		COURSE NAME	TRADITIONAL TURKISH ORNAMENTATION I
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	LANGUAGE
Fall							
1	1	0	0	0	1	COMPULSORY (x) ELECTIVE ()	Turkish

COURSE CATAGORY

General Literature	Foreign Languages	Comparative Literature	Social Science
			X

ASSESSMENT CRITERIA

	Evaluation Type	Quantity	%
	MID-TERM	1st Mid-Term	1
2nd Mid-Term			
Quiz			
Homework			
Project			
Report			
Others (.....)			
FINAL EXAM		1	60

PREREQUIEITE(S)	None
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COURSE DESCRIPTION	Motifs used by Turkish artist in ornamenting his enviroment and objects are taught on the basis of the formation , evolution, composition techniques and application of these techniques according to fields and materials. In addition, the course titled “knots in Turkish ornamental arts” would be taught.
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COURSE OBJECTIVES	The aim of this course is to teach motifs used in Turkish ornamental arts composition and painting techniques.
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ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	They know Turkish ornamental techniques.
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COURSE OUTCOMES	Can make graphical design with the knots (geçme) in millimetrical paper Can make composition with onionskin by using folding over method Can make border composition Can make circular border composition Can make free composition Can transfer a composition to drawing paper Can paint the figure on drawing paper Can make ornaments using watercolour and gouache.
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TEXTBOOK	BUTTANRI, Prof. Dr. Halil, Türk Süsleme Sanatında Geçmeler, Osmangazi Üniversitesi Yayınları, Eskişehir, 2003
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OTHER REFERENCES	ÖZKEÇECİ, İlhan-Şule Bilge Özkeçeci, Türk Sanatında Tezhip, Seçil Ofset, İstanbul, 2007 DEMİRİZ, Yıldız, İslam Sanatında Geometrik Süsleme, İstanbul, 2000 ÜNVER, Prof. Dr. A. Süheyl, Doğuda Kitap Süslerinden Bir Kısım Geçmeler Hakkında, Arkitek, No:11-12, İstanbul, 1946 ayrı baskı, Cumhuriyet Matbaası, İstanbul, 1947.
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	AKAR, Azade-KESKİNER, Cahide, Türk Süsleme Sanatlarında Desen ve Motif, Tercüman Sanat ve Kültür Yayınları:2, İstanbul, 1978.
TOOLS AND EQUIPMENTS REQUIRED	Drawing paper, watercolour, gouache

COURSE SYLLABUS

WEEK	TOPICS
1	History of Turkish Ornamental Arts
2	History of Turkish Ornamental Arts
3	The composition techniques in Turkish Ornamental Arts
4	Graphical design with the knots (geçme) in millimetrical paper
5	Graphical design with the knots (geçme) in millimetrical paper
6	Composition with onionskin by using folding over method
7	Composition with onionskin by using folding over method
8	Midterm
9	Design border composition
10	Design circular border composition
11	Composition transfer on drawing paper
12	Painting figures on drawing paper.
13	Painting with watercolour and gouache
14	Painting with watercolour and gouache
15,16	Final

NO	PROGRAM OUTCOMES	3	2	1
1	having sufficient knowledge in the fields of social sciences and the Turkish Language and Literature; the ability to apply theoretical and practical knowledge to solve the problems of the Turkish Language and Literature in this fields			X
2	the science of Turkish Language and Literature and detection of complex issues in related fields, characterization and selecting appropriate methods of analysis and solving skills by applying these methods			X
3	create a text in line with defined objectives or finding appropriate way to gain the ability of apply about how to resolve		X	
4	improving,selecting,using modern techniques and tools for the science of Turkish Language and Literature and the ability of utilization from information technology effectively		X	
5	analysing of the text belong to the Turkish Language and Literature field or data collecting for to solve the problems, accessing to old and new resources for this, analyzing the results and ability to observation.			X
6	ability to individual work and teamwork of disciplinary and interdisciplinary	X		
7	communicating effectively in oral and written and using/improving knowledge of foreign languages and ability to obtain artistic gratification.	X		
8	awareness of the need for lifelong learning; access to information, following the developments in science and technology and the ability of self-renewal consistently.	X		
9	the professional and ethical awareness of responsibility			X
10	knowledge about work-related applications such as project management, risk management and change management; awareness about entrepreneurship, innovation and sustainable development			X
11	knowledge about social, artistic, cultural and psychological effects of Turkish Language and Literature studies on global and societal		X	

1: None. **2:** Partially contribution. **3:** Completely contribution.



ESOGU Physics Department Course Information Form

COURSE CODE	121311193	COURSE NAME	GARDEN DESIGNING, TREATING and GREENHOUSE CULTURE I
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			LANGUAGE
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	
1	1	0	0	1	1	COMPULSORY () ELECTIVE (X)	TURKISH

COURSE CATEGORY			
Basic Science	Basic Engineering	Biology [if it contains considerable design, mark with (√)]	Social Science
X		X	

ASSESSMENT CRITERIA			
MID-TERM	Evaluation Type	Quantity	%
	1st Mid-Term	1	40
	2nd Mid-Term		
	Quiz		
	Homework		
	Project		
	Report		
	Others (.....)		
FINAL EXAM	Written exam	1	60

PREREQUIEITE(S)	None
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COURSE DESCRIPTION	The history of arrangement of garden and greenhouse culture. Ecological needs of plants. Important points of the garden arrangement and its maintenance. The maintenance of decorative flowers, matlocking of the soil, fighting against the herbal disorders. Irrigation. Fertilization Equipments for arrangement of garden and greenhouseculture Herbs used in garden arrangement.
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COURSE OBJECTIVES	The aim of this course, to teach general concept of garden arrangement and Greenhouse techniques, classification of garden types and greenhouse to teach the issues to consider when establishing a greenhouse, to teach detailed information about the history of garden arrangement and greenhouses, internal regulation of gardens and greenhouse and to teach how irrigation should be.
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ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	Course will contribute . practical garden arrangement and curation; inner and outer arrangements. to make the students self-confident in works of gardening. To teach conciousness of nature to the students.
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COURSE OUTCOMES	Learning general concept of garden designing and greenhouse techniques. Learning historical development process of gardening. Comprehending the ecological needs of plants. Comment about the ecological needs of plants. Comprehending subjects that is paid attention about gardening. Recognized the plants that are used in gardening.
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TEXTBOOK	TOKUR, S.,1994. Bitki Yetiştirme Tekniği, T.C. Osmangazi Ün.v.Yayınları No:1 Fen Edebiyat Yayınları No:1 ESKİŞEHİR.
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OTHER REFERENCES	1. KONEMANN, 1999. BOTANICA, The Illustrated A-Z of over 10000 garden plants and how to cultivate them. Pg:1020, Random House Australia, ISBN:3-8290-3068-1. 2. TOKUR, S., 2000 T.C. Osmangazi Üniversitesi Fen Edebiyat Fakültesi Bahçe Bakımı ve Seracılık I-II Papers, ESKİSEHIR 3. ÜRGENÇ, S., 1992. Ağaç ve Süs Bitkileri, Fidanlık ve Yetiştirme Tekniği, İ.Ü. Basımevi ve Film Merkezi, İSTANBUL.
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TOOLS AND EQUIPMENTS REQUIRED	Projection and computer.
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COURSE SCHEDULE	
WEEK	TOPICS
1	The historical development of gardening.
2	Ecological needs of plants(Climatical properties).
3	Ecological needs of plants(Soil properties).
4	Properties that is necessary for gardening.
5	Tools that are used in gardening and greenhouse.
6	1st Mid-Term; mosaic plans and upholstery plants.
7	Mosaic plans and upholstery plants.
8	Squat, creeping plants.
9	Grass plants.
10	Grass plants.
11	2nd Mid-Term. Trees and shrubs.
12	Trees and shrubs.
13	Trees and shrubs.
14	Stony garden plants.
15,16	Final Exam

NO	PROGRAM OUTCOMES	3	2	1
1	Applies the knowledge in the field of basic sciences on the processes related to living organisms and the ecosystem		X	
2	Correlates functions of the organization and structure with the main examples of biological diversity elements.	X		
3	Classifies the biological diversity elements according to their similarities and differences and gives priority to the protection of them		X	
4	Analyzes the interaction of organisms with their environment		X	
5	Identifies problems from environmental and organisms sources and suggests solutions for these problems			X
6	Produces alternatives for Bio-based product development and production processes			X
7	Works in the industries that use biologically-based methods.			X
8	Gives priority to the health and environmental safety on the processes related to sustainable development			X
9	Susceptible to the team work	X		
10	Uses the science and the scientific method as guide and aware of professional ethical issues		X	
11	Able to communicate effectively.			X
12	Knows at least one language to follow up the knowledge in the field			X
13	Use information technologies effectively as part of the life			X
14	Contributes to projects related to social responsibility by considering national priorities			X
15	Displays a positive attitude to lifelong learning			X

1:None. 2:Partially contribution. 3: Completely contribution.

Instructor(s):



DEPARTMENT		SEMESTER	Fall
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COURSE CODE		COURSE NAME	Calligraphy-I
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	LANGUAGE
1	1	0	0	0	1	COMPULS. () ELECT. (x)	Turkish

COURSE CATAGORY							
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Basic Science	Basic Engineering						Social Science
x							

ASSESSMENT CRITERIA							
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MID-TERM	Evaluation Type	Quantity	%
	1st Mid-Term		50
	2nd Mid-Term		
	Quiz		
	Homework		
	Project		
	Report		
	Others (.....)		
FINAL EXAM	Final Exam		50

PREREQUISITE(S)	Non
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COURSE DESCRIPTION	<p>The brief history of calligraphy, the importance of the goodness of daily handwriting, the importance of the quality of the tools which are used for artistic writing, the “one by one” writing of the letters in the alphabet, the connection shapes of the letters while making syllables and words, the writing of the short sentences in calligraphy. The arrangement of the examination papers.</p> <p>Free script studies as calligraphy, conduction to the “line order” in calligraphy, writing studies of short sentences in calligraphy, free text studies in calligraphy.</p>
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COURSE OBJECTIVES	To gain understanding of aesthetic in art.
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COURSE ADDITION TO APPLY PROFESSIONAL EDUATION	To provide general education about the art of calligraphy
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COURSE OUTCOMES	To provide an interest in calligraphy
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TEXTBOOK	<p>1- M. Bedreddin Yazır, Medeniyet Aleminde Yazı ve İslam Medeniyetinde Kalem Güzeli (Cilt I, II, III), Ankara (1974)</p> <p>2 - Necati Yağan, MEB Yayınları, İstanbul (2005)</p> <p>3 - Hüseyin Kılıçkan, Okullarda Yazı Doğru ve Güzeli Yazmak , İstanbul (2004)</p> <p>4 - Hüseyin Kılıçkan, Alıştırma-Testli Yazı Örnekleri, Taç Kitabevi, Ankara</p> <p>5 - İ. Hakkı Baltacıoğlu, Türklerde Yazı Sanatı, Kültür Bakanlığı, Ankara, 1993</p>
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OTHER REFERENCES	
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TOOLS AND EQUIPMENTS REQUIRED	Pencil from Reed, Ink from Soot, Appropriate Paper.
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ESOGU Physics Department Course Information Form

COURSE CODE		COURSE NAME	TRADITIONAL TURKISH ORNAMENTATION II
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	LANGUAGE
2	1	0	0	0	1	COMPULSORY (x) ELECTIVE ()	Turkish

COURSE CATAGORY

General Literature	Foreign Languages	Comparative Literature	Social Science
			X

ASSESSMENT CRITERIA

MID-TERM	Evaluation Type	Quantity	%
	1st Mid-Term		
2nd Mid-Term			
Quiz			
Homework			
Project			
Report			
Others (.....)			
FINAL EXAM			60

PREREQUIEITE(S)

None

COURSE DESCRIPTION

Motifs used by Turkish artist in ornamenting his enviroment and objects are taught on the basis of the formation , evolution, composition techniques and application of these techniques according to fields and materials. In addition, the course titled “Münhani, Şemse, Rumiler, Turkish clouds and herbal motifs” would be taught.

COURSE OBJECTIVES

The aim of this course is to teach motifs used in Turkish ornamental arts composition and painting techniques.

ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION

They know Turkish ornamental techniques.

COURSE OUTCOMES

Can make graphical designs using Münhani, Şemse, Rumiler, Turkish clouds and herbal motifs.
Can make free composition
Can transfer a composition to drawing paper
Can paint the figure on drawing paper
Can make ornaments using watercolour and gouache.

TEXTBOOK

AKAR, Azade-KESKİNER, Cahide, Türk Süsleme Sanatlarında Desen ve Motif, Tercüman Sanat ve Kültür Yayınları:2, İstanbul, 1978.

OTHER REFERENCES

BUTTANRI, Prof. Dr. Halil, Türk Süsleme Sanatında Geçmeler, Osmangazi Üniversitesi Yayınları, Eskişehir, 2003
DEMİRİZ, Yıldız, İslam Sanatında Geometrik Süsleme, İstanbul, 2000
ÜNVER, Prof. Dr. A. Süheyl, Doğuda Kitap Süslerinden Bir Kısım Geçmeler Hakkında, Arkitek, No:11-12, İstanbul, 1946 ayrı baskı, Cumhuriyet Matbaası, İstanbul, 1947.

TOOLS AND EQUIPMENTS REQUIRED

Drawing paper, watercolour, gouache

COURSE SYLLABUS	
WEEK	TOPICS
1	Motifs in Turkish ornamental art.
2	Motifs in Turkish ornamental art.
3	Designing with Munhani and Rumi motifs.
4	Designing with Şemse motif.
5	Turkish cloud motifs.
6	Herbal motifs.
7	Midterm
8	Composition transfer on drawing paper
9	Composition transfer on drawing paper
10	Painting figures on drawing paper.
11	Painting figures on drawing paper.
12	Painting figures on drawing paper.
13	Painting with watercolour and gouache
14	Painting with watercolour and gouache
15,16	Final

NO	PROGRAM OUTCOMES	3	2	1
1	having sufficient knowledge in the fields of social sciences and the Turkish Language and Literature; the ability to apply theoretical and practical knowledge to solve the problems of the Turkish Language and Literature in this fields			x
2	the science of Turkish Language and Literature and detection of complex issues in related fields, characterization and selecting appropriate methods of analysis and solving skills by applying these methods			x
3	create a text in line with defined objectives or finding appropriate way to gain the ability of apply about how to resolve		x	
4	improving,selecting,using modern techniques and tools for the science of Turkish Language and Literature and the ability of utilization from information technology effectively		x	
5	analysing of the text belong to the Turkish Language and Literature field or data collecting for to solve the problems, accessing to old and new resources for this, analyzing the results and ability to observation.			x
6	ability to individual work and teamwork of disciplinary and interdisciplinary	x		
7	communicating effectively in oral and written and using/improving knowledge of foreign languages and ability to obtain artistic gratification.	x		
8	awareness of the need for lifelong learning; access to information, following the developments in science and technology and the ability of self-renewal consistently.	x		
9	the professional and ethical awareness of responsibility			x
10	knowledge about work-related applications such as project management, risk management and change management; awareness about entrepreneurship, innovation and sustainable development			x
11	knowledge about social, artistic, cultural and psychological effects of Turkish Language and Literature studies on global and societal		x	
1: None. 2: Partially contribution. 3: Completely contribution.				



ESOGU Physics Department Course Information Form

COURSE CODE	121312187	COURSE NAME	Physical Education II
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Labratory	Credit	ECTS	TYPE	LANGUAGE
2	1			0	1	COMPULSORY () ELECTIVE (x)	Turkish

COURSE CATAGORY			
Basic Science	Basic Engineering	Mechanical Engineering Profession [if it contains considerable design, mark with (√)]	Social Science

ASSESSMENT CRITERIA			
	Evaluation Type	Quantity	%
MID-TERM	1st Mid-Term	1	40
	2nd Mid-Term		
	Quiz		
	Homework		
	Project		
	Report		
	Others (.....)		
FINAL EXAM		1	60

PREREQUIEITE(S)	
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COURSE DESCRIPTION	Physical education; running, joint and muscle groups convenient to theirs level, sport branch, basketball, volleyball, handball ,football, field measures and rules of game, sport benefits to our health; health, first aid, matches in class.
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COURSE OBJECTIVES	The ability of having knowledge concerning the orders of the lecture. The ability of running all the organs and systems to convenience of theirs level. The ability of improving the nerve muscle and joint coordinating. The ability of having basic knowledge, skill, manner and habits concerning physical education and sport Take responsibility and duty, to go with leader and the ability of doing leadership Playing amicably and competition appreciating the winner acceptance of loosing, and can be object to trick and injustice. Having knowledge about sport, vehicle and facilities and can use this.
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ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	
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COURSE OUTCOMES	The ability of growing health, happy, developed aspect of physical and psychological, self confident individuals who have the sense competitioning amicably.
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TEXTBOOK	Physical Education at Schools (Hikmet Aracı 1999)
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OTHER REFERENCES	Basic principles in Physical Education and Sport (Yrd. Doç. Dr. Faruk Yamaner)2001
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TOOLS AND EQUIPMENTS REQUIRED	
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COURSE SYLLABUS	
WEEK	TOPICS
1	Giving general knowledge about the subject of physical education.
2	Jogging, rotating which is softening joint and muscle groups. Giving knowledge about basic basketball rules, the matters to take care of passing and rubbing ball.
3	Jogging, warning movements, defense and offence studies at basketball.
4	Jogging, stretching movements, rubbing ball, exit to turnstile studies, attack sets at basketball.
5	Atatürk's words on sport, jogging, passing and playing short-time match in basketball playing rules.
6	Jogging, stretching movements, giving basic knowledge about basic volleyball techniques, finger pass on net and control pass studies.
7	Interval studying, stretching movements headline at volleyball, pass and service firing, return in field at volleyball.
8	What's benefit of sport our health? Stretching movements, doing match in volleyball playing rules.
9	Running athletics (short, middle, long) knowledge about distance, warning studying, short-time volleyball match.
10	Jogging, stretching movements, giving knowledge about basic handball techniques.
11	Jogging, movement for strengthening joint and muscles groups, rubbing ball and pass studies at handball.
12	Exercise for stretching and loosening the muscles, football playing rules and passing studies, short-time football match.
13	First aid at sport disability, jogging, stretching movements, marches in class.
14	Jogging, warning movements, matches in class
15,16	Jogging, stretching studies, matches in class

NO	PROGRAM OUTCOMES	3	2	1
1	Having knowledge course order and sport hall.	X		
2	The ability of strengthening all the organs and systems according to their's convenient level.	X		
3	Improving physical skills.	X		
4	Improving nerve, muscle and joint coordinating.	X		
5	Explaining Atatürk's words on sport and sportmen	X		
6	Having basic knowledge skill, manner and habit about sport	X		
7	Playing basketball and volleyball with playing rules.	X		
8	Having comprehend the benefits of sport and can be willing to spent his/her free time to do them	X		
9	Improving physical ability and learn the means of increasing durability.	X		
10	Having basic knowledge, skill, manner and habits about sport.	X		
11	Having learned handball and football playing rules and applying them.	X		
12	Having knowledge about Olympiad.	X		
13	Learning how can be helping a sportman who is disabled.	X		
14	Having basic knowledge, skill, manner and habits, racing amicably and appreciating the winner.	x		
1:None. 2:Partially contribution. 3: Completely contribution.				



DEPARTMENT					SEMESTER	Spring	
COURSE CODE				COURSE NAME	Calligraphy -II		
SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Laboratory	Credit	ECTS	TYPE	LANGUAGE
2	1	0	0	0	1	COMPULS. () ELECT. (x)	Turkish
COURSE CATAGORY							
Basic Science		Basic Engineering				Social Science	
x							
ASSESSMENT CRITERIA							
MID-TERM				Evaluation Type		Quantity	%
				1st Mid-Term			50
				2nd Mid-Term			
				Quiz			
				Homework			
				Project			
				Report			
Others (.....)							
FINAL EXAM				Final Exam			50
PREREQUISITE(S)				Non			
COURSE DESCRIPTION				Writing studies of short sentences in calligraphy, free text studies in calligraphy.			
COURSE OBJECTIVES				To gain understanding of aesthetic in art.			
COURSE ADDITION TO APPLY PROFESSIONAL EDUATION				To provide general education about the art of calligraphy			
COURSE OUTCOMES				To provide an interest in calligraphy			
TEXTBOOK				1- M. Bedreddin Yazır, Medeniyet Aleminde Yazı ve İslam Medeniyetinde Kalem Güzeli (Cilt I, II, III), Ankara (1974) 2 - Necati Yağan, MEB Yayınları, İstanbul (2005) 3 - Hüseyin Kılıçkan, Okullarda Yazı Doğru ve Güzeli Yazmak , İstanbul (2004) 4 - Hüseyin Kılıçkan, Alıştırımalı-Testli Yazı Örnekleri, Taç Kitabevi, Ankara 5 - İ. Hakkı Baltacıoğlu, Türklerde Yazı Sanatı, Kültür Bakanlığı, Ankara, 1993			
OTHER REFERENCES							
TOOLS AND EQUIPMENTS REQUIRED				Pencil from Reed, Ink from Soot, Appropriate Paper.			



ESOGU Physics Department Course Information Form

COURSE CODE: 121313316

COURSE NAME: History of Science in Physics I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
3	2	0	2	2	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
2		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
Other (Internship)			Other (.....)			
FINAL EXAM		1	50			
MAKE UP EXAM (Oral/Written)	Written					
PREREQUISIT(S) IF ANY	-					
SHORT COURSE CONTENT	1. In ancient civilizations Science; in Egypt and Mesopotamia science, in the ancient Greeks science, in the Romans science, 2. Medieval Europe and in the Islamic World Science; the medieval view of science, in the Islamic world science, 3. Renaissance and Modern Science; studies in astronomy, developments in the natural sciences, Galileo Galilei, Isaac Newton, theories of light, 4. Science in the age of Enlightenment; in the 18th century natural sciences, 5. Euler, Lagrange, Laplace, d'Alembert, C. A. Coulomb, J. L. Lagrange, J. Watt, L. Galvani, 6. The industrial revolution and science; in the 19th century natural sciences,					
OBJECTIVES OF THE COURSE	The main objective of this course, as the periodic phases of science philosophy of science, and cultural structure that period by evaluating the time, scientists have reached includes examining how scientific findings.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING	Giving students a sense of wonder of science with the transfer of development from yesterday to today.					
LEARNING OUTCOMES OF THE COURSE	Philosophical approach to the historical development of physics and natural sciences, Taking in conjunction with scientists learn more about the conditions of their day, Being motivated by love of science and scientific work.					
MAIN TEXTBOOK	Cemal Yıldırım. (1997). Bilim Tarihi. İstanbul: Remzi Kitapevi					
SUPPORTING REFERENCES	1. Sevim Tekeli, Esin Kaya, Remzi Demir, H. Gazi Tepdemir, Yavuz Unat. (1997). Bilim Tarihi. İstanbul: Doruk Yayınları 2. A. O. Gürel (2001). Doğa Bilimleri Tarihi. Ankara: İmge Kitapevi 3. Cemal Yıldırım. (1996). Bilimin Öncüleri. Ankara: Tübitak Yayınları 4. Infeld, L. (Çeviri: Cemal Yıldırım / 1999). Albert Einstein/Bilimsel Kişiliği ve Dünyamıza Etkisi. İstanbul: Bilgi Yayınevi					
NECESSARY COURSE MATERIALS	-					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to Ancient Civilizations
2	In the Egypt and Mesopotamia science, in the ancient Greeks science, in the Romans science
3	Introduction to Medieval Europe and Islamic World
4	During the medieval view of science, in the Islamic world science
5	Midterm Exam 1
6	Introduction to the Renaissance and Modern
7	Astronomy studies, developments in the natural sciences
8	Wave mechanics, X-Rays and the Bragg diffraction, Compton Effect
9	Galileo Galilei, Isaac Newton, Theories of Light
10	Midterm Exam 2
11	Introduction to the science of the Enlightenment era
12	In the 18th century natural sciences,
13	Euler, Lagrange, Laplace, d'Alembert, C. A. Coulomb, J. L. Lagrange, J. Watt, L. Galvani
14	The industrial revolution and science; in the 19th century natural sciences
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121313317

COURSE NAME: Technical English I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
3	2	0	2	2	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		To teach students the concepts of technical and scientific English.					
OBJECTIVES OF THE COURSE		To bring up students to a sufficient level in English.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To learn how to translate a written material into Turkish.					
LEARNING OUTCOMES OF THE COURSE		Various physical and technical manuscripts and easy journal articles					
MAIN TEXTBOOK		Lecture notes.					
SUPPORTING REFERENCES		Physics Today and Scientific American journals.					
NECESSARY COURSE MATERIALS		AV materials are required.					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Basics of technical English
2	Grammar review
3	The verbal usages
4	Analysis of a technical paper
5	Midterm Exam 1
6	Translation of a technical and physical paper
7	Translation of a sample paper in the class
8	Distribution of translational papers to students and teaching of methodology
9	Analysis of the translated paper in the class.
10	Midterm Exam 2
11	Revisited of the paper translated
12	A paper from Physics today
13	A paper from the Scientific American
14	Review of translation methods and final comments.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	x				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	x				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121313318

COURSE NAME: Geophysics

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
3	2	0	2	2	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM		Written	1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		None					
SHORT COURSE CONTENT		Introduction to geophysics, physical properties of the earth, development of the geophysics in Turkey, Gravimetry, Gravity, Newton's law, determination of gravity, jeostazi, Magnetism, Coulomb's law, seismographs, the methods of electric and magnetic, earthquakes.					
OBJECTIVES OF THE COURSE		Learn the science and application of geophysical					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING							
LEARNING OUTCOMES OF THE COURSE		Understanding between the application fields of physics and geophysics					
MAIN TEXTBOOK		Garland, (1979), Introduction to Geophysics Newyork: Saunders Howell,(1978), Introduction to Geophysics, Londra: Kreiger					
SUPPORTING REFERENCES							
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to geophysics
2	physical properties of the earth
3	development of the geophysics in Turkey
4	Gravimetry, Gravity
5	Midterm Exam 1
6	Newton's law
7	Newton's law
8	determination of gravity
9	jeostazi,
10	Midterm Exam 2
11	Magnetism
12	Coulomb's law
13	seismographs
14	The methods of electric and magnetic, earthquakes.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	x				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	x				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121313319

COURSE NAME: METROLOGY

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
3	2	0	2	2	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
2		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	20	Midterm Exam	-	-
	Quiz	-	-	Experimenting Performance	-	-
	Homework	-	-	Reporting	-	-
	Project	-	-	Oral Exam or Quiz	-	-
	Other (Internship)	-	-	Other (.....)	-	-
FINAL EXAM			1	60	-	-
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Introduction to Metrology, Purpose and Importance of Metrology, Terms and Concepts, Physical Enormities, International Measurement Systems (SI), The Terminology of Measuring Devices, Characteristics of Measuring Devices and Measuring Devices, Measurement Standards,A Range of Measures				
OBJECTIVES OF THE COURSE		To provide professional knowledge, to get the task to train for industry and research laboratory.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Students gain in measurement science and related agencies working to create the infrastructure. Those who work the required training provide a potential of in area.				
LEARNING OUTCOMES OF THE COURSE		Basic Knowledge of Measurement Science , Calibration Applications of Measurement Science				
MAIN TEXTBOOK		Metrology and Physics (Prof. Dr. Naci EKEM)				
SUPPORTING REFERENCES		Measurement Science Notes 1 and 2, Metrology Book (UME)				
NECESSARY COURSE MATERIALS		Possibilities of ESOĞÜ Medicine, Education, Research and Application Faculty Calibration Laboratory, UME Laboratory, TSE Laboratory and Special Calibration Laboratory				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to Metrology, Purpose and Importance of Metrology
2	Terms and Concepts,
3	Physical Enormities and Units
4	Physical Enormities and Units, International Metrology
5	Midterm Exam I
6	International Metrology Systems
7	International Measurement Systems (SI)
8	The Terminology of Measurements
9	The Terminology of Measuring Devices
10	Midterm Exam I
11	Introduction to Measurement Devices
12	Introduction to Measurement Standarts
13	Introduction to Measurement Area
14	General Assessment
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121313320

COURSE NAME: Popular physics

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
3	2	0	2	3	COMPULSORY (x) ELECTIVE ()	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
1						
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam			Midterm Exam	2	25
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM					1	50
MAKE UP EXAM (Oral/Written)	Written					
PREREQUISIT(S) IF ANY	-					
SHORT COURSE CONTENT	Physics related devices and funfamental physics laws					
OBJECTIVES OF THE COURSE	Physics related devices					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING	Analytical thinking and comparison of the their research fields.					
LEARNING OUTCOMES OF THE COURSE	<ol style="list-style-type: none">1. Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)2. Identify, formulate, and solve field related problems3. Design and conduct experiments as well as to analyze and interpret data4. Interdisciplinary knowledge association and application5. Direct correlation and application of gained knowledge with technology and industry6. Get a recognition of the need for, and an ability to engage in life-long learning7. Gain a knowledge of contemporary issues					
MAIN TEXTBOOK	Lecture notes					
SUPPORTING REFERENCES	Halliday, D. & Resnick, R. (2002). Çeviri Editörü: Yalçın, C. Fiziğin Temelleri. Ankara: Arkadaş Yayınevi. Serway, R.A. (1990). Çeviri Editörü: Çolakoğlu, K. Fen ve Mühendislik için Fizik. Ankara: Palme Yayıncılık.					
NECESSARY COURSE MATERIALS						

COURSE SYLLABUS

WEEK	TOPICS
1	Matter and structure
2	4 state of matter
3	Space
4	Big bang to nowadays
5	About CERN
6	Nuclear energy
7	Nano and more
	Midterm exam
8	Nano and more
9	Meramaterials
10	Sensors
11	Physics related devices
12	Physics related devices
13	Physics related devices
14	Physics related devices
15,16	Physics related devices

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES

(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		X			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.					X
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.				X	
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.				X	
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.				X	
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.				X	
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.				X	
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.				X	
12	To have knowledge about the modern problems that are local and global.			X		

Prepared by:

Signature(s):

Date:



ESOGU Physics Department Course Information Form

COURSE CODE: 121313320

COURSE NAME: Born of Modern Physics

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
3	2	0	2	3	COMPULSORY (x) ELECTIVE ()		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
1		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	1	50	Midterm Exam	2	25
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM			1	50		1	50
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY							
SHORT COURSE CONTENT		Special theory of relativity, Galilean and Lorentz transformations, relativistic mechanics, atomic structure of matter, quantization of light, blackbody radiation, photoelectric effect, waves and particles, de Broglie's hypothesis, the uncertainty principle, wave mechanics, and the Bragg diffraction of X-Rays,					
OBJECTIVES OF THE COURSE		The main objective of this course, basic principles and concepts of modern physics is to learn.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To work to better understand the nature of some aspects of physical development which is implemented by transferring students to the basic theories.					
LEARNING OUTCOMES OF THE COURSE		Learning about the basic principles and concepts of modern physics Mathematics is the ability to apply knowledge of basic sciences such as physics and chemistry. Ability to analyze and explain natural phenomena. Problems concerning the structure of the substance to identify, formulate, and solve. Interpret the most basic concepts in detail. Interdisciplinary knowledge and application skills relate. Vocational skills of contemporary issues.					
MAIN TEXTBOOK		Beiser, A. (1969). Perspectives of Modern Physics. McGraw-Hill.					
SUPPORTING REFERENCES		1. Gündüz, E. (1999). Modern Fiziğe Giriş. İzmir: Ege Üniv. Fen Fak. Kitaplar Serisi No:110. 2. Taylor, J.R., Zafaritos, C. (1996). Modern Fizik. İstanbul: Arte Güven.					
NECESSARY COURSE MATERIALS							

COURSE SYLLABUS	
WEEK	TOPICS
1	Basic principles and concepts of modern physics
2	Special theory of relativity, Galilean and Lorentz transformations
3	Relativistic mechanics, atomic structure of matter
4	Quantization of Light
5	Black body radiation, photoelectric effect,
6	Waves and particles, de Broglie's hypothesis, the uncertainty principle
7	Wave mechanics, and the Bragg diffraction of X-Rays, Compton Effect
	Midterm exam
8	Bohr-Sommerfeld atomic theory, Bohr's theory of wave mechanics and compare the results
9	Bohr-Sommerfeld atomic theory, Bohr's theory of wave mechanics and compare the results
10	Quantum theory of hydrogen atom
11	Vector model of the atom and the electron system,
12	The molecular structure of molecular spectra
13	Nuclear structure and radioactivity.
14	
15,16	

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		X			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.					X
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.				X	
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.				X	
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.				X	
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.				X	
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.				X	
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.				X	
12	To have knowledge about the modern problems that are local and global.			X		

Prepared by:

Signature(s):

Date:



ESOGU Physics Department Course Information Form

COURSE CODE: 121314316

COURSE NAME: HISTORY OF SCIENCE IN PHYSICS II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
4	2	0	2	2	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
2		(x)				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam	-	-
	Quiz	-	-	Experimenting Performance	-	-
	Homework	-	-	Reporting	-	-
	Project	-	-	Oral Exam or Quiz	-	-
Other (Internship)	-	-	Other (.....)	-	-	
FINAL EXAM		1	50		-	-
MAKE UP EXAM (Oral/Written)	Written					
PREREQUISIT(S) IF ANY	-					
SHORT COURSE CONTENT	Modern science; at the beginning of the century 20th natural sciences, Einstein's theories; Special and General Relativity; Detailed examination of the birth of quantum theory During the century 20. scientific discoveries that marked the history of science and scientists.					
OBJECTIVES OF THE COURSE	The main objective of this course, as the periodic phases of science philosophy of science, and cultural structure that period by evaluating the time, scientists have reached includes examining how scientific findings.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING	Developed and implemented to-date studies will facilitate the transfer of modern science.					
LEARNING OUTCOMES OF THE COURSE	1. Philosophical approach to the historical development of physics and natural sciences, 2. Taking in conjunction with scientists learn more about the conditions of their day, 3. Being motivated by love of science and scientific work,					
MAIN TEXTBOOK	Cemal Yıldırım. (1997). Bilim Tarihi. İstanbul: Remzi Kitapevi					
SUPPORTING REFERENCES	1. Sevim Tekeli, Esin Kaya, Remzi Demir, H. Gazi Tepdemir, Yavuz Unat. (1997). Bilim Tarihi. İstanbul: Doruk Yayınları 2. A. O. Gürel (2001). Doğa Bilimleri Tarihi. Ankara: İmge Kitapevi 3. Cemal Yıldırım. (1996). Bilimin Öncüleri. Ankara: Tübitak Yayınları 4. Infeld, L. (Çeviri: Cemal Yıldırım / 1999). Albert Einstein/Bilimsel Kişiliği ve Dünyamıza Etkisi. İstanbul: Bilgi Yayınevi					
NECESSARY COURSE MATERIALS	-					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	General Information about Modern Science
2	At the beginning of 20. the century natural sciences
3	At the beginning of 20. the century natural sciences
4	Einstein's theories
5	Midterm Exam 1
6	Einstein's theories
7	Special and General Relativity
8	Special and General Relativity
9	Detailed examination of the birth of quantum theory
10	Midterm Exam 2
11	Detailed examination of the birth of quantum theory
12	20. scientific discoveries during the century that marked the history of science
13	20. scientific discoveries during the century that marked the history of science
14	Scientists who Contributions to science.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121314317

COURSE NAME: Technical English II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
4	2	0	2	2	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		To teach students the concepts of technical and scientific English.					
OBJECTIVES OF THE COURSE		To bring up students to a sufficient level in English.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To learn how to translate a written material into Turkish.					
LEARNING OUTCOMES OF THE COURSE		Various physical and technical manuscripts and easy journal articles					
MAIN TEXTBOOK		Lecture notes.					
SUPPORTING REFERENCES		Physics Today and Scientific American journals.					
NECESSARY COURSE MATERIALS		AV materials are required.					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Basics of technical English
2	Grammar review
3	The verbal usages
4	Analysis of a technical paper
5	Midterm Exam 1
6	Translation of a technical and physical paper
7	Translation of a sample paper in the class
8	Distribution of translational papers to students and teaching of methodology
9	Analysis of the translated paper in the class.
10	Midterm Exam 2
11	Revisited of the paper translated
12	A paper from Physics today
13	A paper from the Scientific American
14	Review of translation methods and final comments.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	x				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	x				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121314318

COURSE NAME: THERMAL PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
4	2	0	2	2	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		Modern physics, Thermodynamics, Differential Equations I-II					
SHORT COURSE CONTENT		Fundamental concepts; the laws of Thermodynamics; temperature; thermal equilibrium; heat flux; equation of heat conduction and its solution methods; heat transfer by conduction; heat transfer by radiation; heat transfer by convection; heat exchangers.					
OBJECTIVES OF THE COURSE		To learn of fundamentals of the heat transfer and calculations					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To learn and apply heat transfer calculations and applications.					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues					
MAIN TEXTBOOK		Çengel, Y. A. (2003). Heat transfer: A practical approach. Boston: McGraw Hill.					
SUPPORTING REFERENCES		Incropera, P.F. Dewitt, D.P. (2001). Introduction to heat transfer. New York: John Wiley & Sons. Çengel, Y. A. (1997). Introduction to thermodynamics and heat transfer. Boston: McGraw Hill. Kakaç, S. (1982). Örneklerle Isı Transferi. Ankara: Güven Kitapevi. Özemre, A. Y. (1987). Isı teorisi. İstanbul: İstanbul Üniversitesi Yayınları. Saraç, C. (1985). Termodinamik Prensipleri. İzmir: Ege Üniversitesi Yayınları.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Fundamental concepts
2	Thermodynamics laws
3	thermal equilibrium; heat flux
4	thermal equilibrium; heat flux
5	Midterm Exam 1
6	equation of heat conduction and its solution methods
7	equation of heat conduction and its solution methods
8	heat transfer by conduction
9	heat transfer by conduction
10	Midterm Exam 2
11	heat transfer by convection
12	heat transfer by convection
13	heat transfer by radiation
14	heat transfer by radiation, heat exchangers.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121314319

COURSE NAME: Astrophysic

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
4	2	0	2	3	COMPULSORY (x) ELECTIVE ()	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
1		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	1	50	Midterm Exam	2	25
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50	1	50
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Observational data of cosmology, aim of cosmology, problem of evaluation of distences in cosmology, Hubble’s law, astronomical data outside of optics, density of universe, theoretical cosmology, metric and knematics of theorotical model, dynamics of theoretical model, special universe models, Big bang.				
OBJECTIVES OF THE COURSE		To introduce both basics of cosmology and the physics of universe.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Students will learn how to examine structure of the universe based on the principles of cosmology and relativity.				
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) 2. Identify, formulate, and solve field related problems 3. Design and conduct experiments as well as to analyze and interpret data 4. Interdisciplinary knowledge association and application 5. Direct correlation and application of gained knowledge with technology and industry 6. Get a recognition of the need for, and an ability to engage in life-long learning 7. Gain a knowledge of contemporary issues 				
MAIN TEXTBOOK		Özemre, A.Y., “Kozmolojiye Giriş”, İstanbul Üniversitesi Fen Fakültesi Yayınları, İstanbul, 1981.				
SUPPORTING REFERENCES						
NECESSARY COURSE MATERIALS						

COURSE SYLLABUS	
WEEK	TOPICS
1	Observational data of cosmology
2	Aim of cosmology
3	Problem of evaluation of distances in cosmology
4	Hubble's law
5	Astronomical data outside of optics
6	Theoretical cosmology
7	Theoretical cosmology
	Midtern exam
8	Metric and kinematics of theoretical model
9	Dynamics of theoretical model
10	Special universe models
11	Special universe models
12	Big bang
13	Cosmic microwave background radiation
14	Inflation and the early universe
15,16	

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		X			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.					X
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.				X	
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.				X	
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.				X	
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.				X	
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.				X	
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.				X	
12	To have knowledge about the modern problems that are local and global.			X		

Prepared by:

Signature(s):

Date:



ESOGU Physics Department Course Information Form

COURSE CODE: 121314320

COURSE NAME: Medical Physics

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
4	2	0	2	3	COMPULSORY (x) ELECTIVE ()	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
1		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	1	50	Midterm Exam	2	25
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50	1	50
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Molecular mechanics, energy and signalization at cellular level, physical fundamentals of seeing and hearing, experimental techniques				
OBJECTIVES OF THE COURSE		Investigate and understand biological systems and processes take place in these systems by using physical concepts				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Associate the students' gained physical knowledge by investigation of phenomena taking place at biological systems				
LEARNING OUTCOMES OF THE COURSE		Fundamental knowledge on biological systems and interpretation of biological processes by physical point of view				
MAIN TEXTBOOK		Prof.Dr. Ferit Pehlivan, Biyofizik, Hacettepe-Taş, Ankara, 2005				
SUPPORTING REFERENCES		Berg, H. C. (1993). Random Walks in Biology. New Jersey: Princeton University Pres. Boal, D. (2002). Mechanics of the Cell. New York: Cambridge Pres. Gürbüz Çelebi. (1995). Biyomedikal Fizik. İzmir: Barış Yayınları Arberts B., et.al. (2002). Molecular Biology of the Cell. Garland Science. de Gennes, P-G. (1979). Scaling Concepts in Polymer Physics. Ithaca: Cornell University Press. Doi, E., Edwards, S. F. (1999). The Theory of Polymer Dynamics. Oxford: Oxford University				
NECESSARY COURSE MATERIALS						

COURSE SYLLABUS

WEEK	TOPICS
1	Bio-filaments and properties of bio-filaments
2	Introduction to molecular mechanics; stress, strain and other deformation types
3	Deformation examples at cellular level and their applications
4	Biorheology and viscoelastic properties in biological systems
5	Energy and signalization in the cell
6	Cell membrane and its mechanical properties
7	Physical fundamentals of signal transmission in nerve cells
	Midterm exam
8	Specialized cells
9	Specialized cells
10	Physical fundamentals of seeing
11	Physical fundamentals of hearing
12	Experimental techniques; AFM, NMR, SPR
13	Experimental techniques; optical tweezers and other micro-manipulation techniques
14	Experimental techniques; optical tweezers and other micro-manipulation techniques
15,16	Final exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES

(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		X			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.					X
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.				X	
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.				X	
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.				X	
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.				X	
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.				X	
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.				X	
12	To have knowledge about the modern problems that are local and global.			X		

Prepared by: Signature(s): Date:



ESOGU Physics Department Course Information Form

COURSE CODE: 121315416

COURSE NAME: INTRODUCTION TO PLASMA PHYSICS I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE					
	Theory	Tutorial	Credit	ECTS	TYPE			
5	3	0	5	7	COMPULSORY () ELECTIVE (x)			
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).								
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social			
3		()						
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES				
MIDTERM		Activity type	Number	%	Activity type	Number	%	
		Midterm Exam	2	25	Midterm Exam			
		Quiz			Experimenting Performance			
		Homework			Reporting			
		Project			Oral Exam or Quiz			
		Other (Internship)			Other (.....)			
FINAL EXAM			1	50				
MAKE UP EXAM (Oral/Written)		Written						
PREREQUISIT(S) IF ANY		-						
SHORT COURSE CONTENT		General information about Plasma, Plasma description, Nature plasmas, Plasma parameters, Plasma classification, The basic processes for the production of low-pressure plasmas, Elastic collisions, Excitation and ionization of atoms and molecules, Photoelectric effect, which is formed with ions in the solid surface of secondary electrons, Thermionic emission, Plasma collective behavior; Thermodynamic equilibrium, The ion and electron mobility, Diffusion of species in plasma, Plasma radiation, The positive column theory						
OBJECTIVES OF THE COURSE		The main objective of the course, Fundamentals of plasma physics and plasma characteristics.						
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		The Importance of Physics in the field of plasma physics. The Importance of Plasma Applications in industry and technology.						
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1.Learning the basics of Plasma. 2.Plasma and understanding of plasma properties. 3.Plasmas in Nature. 4.Learning classification of plasma. 5. Learning the basic events of low pressure plasmas. 6. Explain of Nature Event and analyze. 7.Data analyzing, evaluating, designing and conducting experiments. 8.Acquired information directly with the correlation and application of technology and industry. 						
MAIN TEXTBOOK		Ekem, N. Musa, G., Akan, T (2001), Plasma Physics Lecture Notes, Eskisehir.						
SUPPORTING REFERENCES		Roth,A. (1995) , Vacuum Technology, Amsterdam: Elsevier Publishing Company, Lieberman,M. , Lichtenberg,A.L., Principles of Plasma Discharges And Materials Processing, New York, Wiley-Interscience Publication McDaniel, E.W. (1964) , Collision Phenomena in Ionized Gases, WileySons,Inc. Grill,A. (1993), Cold Plasma in Materials Fabrcation, IEEE Press Marr,G.V. (1968) , Plasma Spectroscopy, Elsevier Publishing Company Griem,H.R., Plasma Spectroscopy, McGraw-Hill Company						
NECESSARY COURSE MATERIALS		-						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to Metrology, Purpose and Importance of Metrology
2	Terms and Concepts,
3	Physical Enormities and Units
4	Physical Enormities and Units, International Metrology
5	Midterm Exam 1
6	International Metrology Systems
7	International Measurement Systems (SI)
8	The Terminology of Measurements
9	The Terminology of Measuring Devices
10	Midterm Exam 2
11	Introduction to Measurement Devices
12	Introduction to Measurement Standarts
13	Introduction to Measurement Area
14	General Assessment
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			

Prepared by: Signature(s):

Date:



ESOGU Physics Department Course Information Form

COURSE CODE: 121315417

COURSE NAME: SOLAR ENERGY-I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
5	3	0	5	7	COMPULSORY () ELECTIVE X ()		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()		x			
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Pollution and Global Warming and Energy, Energy Conservation, Solar Energy Forms Solar Radiation, Spektrumu Solar energy, Thermal Solar Energy Collectors, Hot Air Solar Collectors, Solar Cooling, Concentrators Solar Collectors,					
OBJECTIVES OF THE COURSE		to provide the theoretical information about thermal solar energy					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Solar thermal energy systems design and information					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		REFERENCES HİNDRİCHS; Roger A.; (1996) Energy Its Use AndEnviroment. GOSWAMI, D.Yogi and KREITH, Frank, KREIDER, Jan, F; (2000) Principles of Solar Engineering, Taylor and Francis.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Energy and Energy forms
2	Solar Radioation
3	Air Pollution and energy Use
4	Conservation of Energy
5	Midterm exam 1
6	Solar Spectrum
7	Solar Energy
8	Thermal Solar Energy Systems
9	Flate Plate Water Collectors, Flate Plate Hot Air Collectors
10	Midterm exam 2
11	Solar Cooling
12	Concentrating Solar Collectors
13	Measurement of Solar Radiation
14	The Economics of Solar Systems
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121315418

COURSE NAME: BIOPHYSICS I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
5	3	0	5	7	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Biological systems on bimolecular, organelle, cell, tissue and system levels and physical interactions related to these levels					
OBJECTIVES OF THE COURSE		Investigate and understand biological systems and processes take place in these systems by using physical concepts					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Associate the students' gained physical knowledge by investigation of phenomena taking place at biological systems					
LEARNING OUTCOMES OF THE COURSE		Fundamental knowledge on biological systems and interpretation of biological processes by physical point of view					
MAIN TEXTBOOK		Prof.Dr. Ferit Pehlivan, Biyofizik, Hacettepe-Taş, Ankara, 2005					
SUPPORTING REFERENCES		<p>Berg, H. C. (1993). Random Walks in Biology. New Jersey: Princeton University Pres.</p> <p>Boal, D. (2002). Mechanics of the Cell. New York: Cambridge Pres.</p> <p>Gürbüz Çelebi. (1995). Biyomedikal Fizik. İzmir: Barış Yayınları</p> <p>Arberts B., et.al. (2002). Molecular Biology of the Cell. Garland Science.</p> <p>de Gennes, P-G. (1979). Scaling Concepts in Polymer Physics. Ithaca: Cornell University Press.</p> <p>Doi, E., Edwards, S. F. (1999). The Theory of Polymer Dynamics. Oxford: Oxford University</p>					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to biophysics: Biological systems, classifications, cell and organelles
2	Investigation of biological systems in tissue and organ level
3	Investigation of biological systems in system level
4	Cell biology; organelles and biomolecules
5	Midterm exam 1
6	Investigation of prominent physical scales in cell; related dimensions, force, time and energy
7	Chemical balance in cell
8	Introduction to related statistical physics concepts in cell; heat, temperature, partition function, Boltzman distribution
9	Related statistical physics concepts in cell; fluctuations and entropy
10	Midterm exam 2
11	Genetic synthesis and genetic code in cell
12	Structure and properties of DNA and RNA
13	Structure and properties of proteins
14	Molecular interactions and screening
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	X				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		X			
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121315419

COURSE NAME: Ultrasound

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
5	3	0	3	4	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
2		()		x		
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	20	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	60		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		General principles of wave propagation. Acoustic empedance. Acoustic and radiation pressure. Reflection, reflection and diffraction of acoustic waves.Crystal oscillators. Ultrasonic receiver and senders. Ultrasound waves in gases, liquids and solids. Application of ultrasound and measurement techniques.				
OBJECTIVES OF THE COURSE		<ol style="list-style-type: none"> To learn general properties of acoustic waves. To gain the fundamental knowledge about the uses of ultrasonic waves. Tom learn ultrasonic and its technological applications in industry and medicine. 				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING						
LEARNING OUTCOMES OF THE COURSE						
MAIN TEXTBOOK		<ol style="list-style-type: none"> Beyer, R. & Letcher, S.V. (1969), <i>Physical Ultrasonics</i>, New York; Acad. Press Blitz, J. (1967); <i>Fundamentals of Ultrasonics</i>, New York: Plenum Pub.Co. Mason, W.P. (1992); <i>Physical Acoustics</i>, New York: JAI Press 				
SUPPORTING REFERENCES						
NECESSARY COURSE MATERIALS						
COURSE SCHEDULE						
WEEK	SUBJECTS					
1	General principles of wave propagation					
2	Acoustic empedance					
3	Acoustic and radiation pressure.					
4	Reflection of acoustic waves					

5	Midterm Exam 1
6	Reflection of acoustic waves
7	Diffraction of acoustic waves
8	waves.Crystal oscillators
9	Ultrasonic receiver
10	Midterm Exam 2
11	Ultrasonic senders
12	Ultrasound waves in gases, liquids and solids
13	Application of ultrasound
14	Measurement techniques of ultrasound
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES

(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.			x		
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			x		
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 121315420

COURSE NAME: FLUID MECHANICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
5	3	0	3	4	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
2		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Pressure;Types of fluids;Bernoulli equation;Continuity equation;Poiseuille flow;Laminer flow;Turbulent flow				
OBJECTIVES OF THE COURSE		To teach students the necessary concepts in fluid mechanics.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To teachstudents the necessary equipments for industrial flows.				
LEARNING OUTCOMES OF THE COURSE		The students are taught the the concepts in fluid mechanics in an easy way.				
MAIN TEXTBOOK		Lecture notes				
SUPPORTING REFERENCES		Dimensional analysis subjects				
NECESSARY COURSE MATERIALS		AV materials and internet based simulations.				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to fluid mechanics;static and dynamic pressure concepts.
2	Types of fluids and pressure concept.
3	Laminar flow
4	Bernouilli equation and continuity eq.
5	Midterm Exam 1
6	Laminar flow and Poiseuille flow
7	Reynolds number and turbulent flow
8	Navier-Stokes eq.
9	Solution methods of Navier-Stokes eq.
10	Midterm Exam 2
11	Introduction to industrial flows
12	Application areas of fluid mechanics
13	Atmospheric flows and wind energy
14	General review of subjects.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			x		
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121315421

COURSE NAME: Atmospheric Physics

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
5	3	0	3	4	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Big Bang Theory, Universe, Solar System, Sun, Solar Winds, Geomanetisma, Gravitaion, Magnetosphere, Atmosphere, İonosphere, Propogation of Radio Wave, Space vehicle processing .					
OBJECTIVES OF THE COURSE		To define the knowledge which is required to express, understand and formulate atmospheric physics basic concepts.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)					
MAIN TEXTBOOK		Bagner D. G. (2010), An Introduction to Atmospheric Physics, New York, Cambridge Univ. Pres.					
SUPPORTING REFERENCES		1- Fleagle, R.G. and Busigner, J. A. (1980), An Introduction to Atmospheric Physics, NewYork: Academic Pres. 2- Salby, M.L. (1996). Fundamentals of Atmospheric Physics. California: Elsevier. 3- Aslan, Z., Topçu, S., Barla, C. Ve Özdemir, G. (2004), Atmosfer Fiziği, İstanbul: Papatya Yayınları.					
NECESSARY COURSE MATERIALS		Face to face					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Big Bang Theory, Expansion of Universe, Stars and Planets
2	Universe, Dark Matter, Dark Energy, Visible Universe, Solar System, Planets
3	Sun, Structure of Sun, Fusion reactions, Explosion of the sun
4	State of Gas and Plasma, Motion of Charged particle, transition of charged particles inside gas
5	Midterm Exam 1
6	Solar Winds, Magnetic field of Sun, Motion of charged particles in magnetic field
7	Magnetic field of Earth, Van Allen Belts, Aurora
8	Gravitation
9	Magnetosphere
10	Midterm Exam 2
11	Troposphere, Stratosphere, Mezosphere, Ozonosphere, Kemosphere, Termosphere, Exsosphere
12	Ionosphere
13	Propagation of radio wave
14	Space vehicle processings
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			x		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	x				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121316356

COURSE NAME: Introduction to Plasma Physics II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	5	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (Internship)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		For low-pressure discharges, The voltage-current characteristic; Dark Townsend discharge, Glow discharge, Arc discharge,; Kaufmann rule, The first Townsend coefficient, Breakdown voltage and Paschen's law, Glow discharge; Discharge cathodic region, Positive column, The anodic discharge region, Discharge parameters, Arc discharge				
OBJECTIVES OF THE COURSE		Types and characteristics of electrical discharge				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Learning types and characteristics of electrical discharge, the voltage-current characteristics of the learning for low-pressure discharges, Glow discharge, Arc discharge,analysis to explain natural phenomena, to analyze the data, evaluating, testing and design, acquired the information directly with technology association and implementation, team work ability, professional knowledge of contemporary issues.				
LEARNING OUTCOMES OF THE COURSE		Learning the basics of plasma, plasma and plasma characteristics of understanding, understanding nature, plasmas, plasma classification learning. Learning the basic phenomena of low-pressure plasmas. To analyze the data, evaluate, and design of experiment. With the information obtained directly from the correlation and application of technology and industry.				
MAIN TEXTBOOK		Ekem, N. Musa, G., Akan, T (2001), Plasma Physics Lecture Notes, Eskisehir.				
SUPPORTING REFERENCES		Roth,A. , Vacuum Technology, Amsterdam: Elsevier Publishing Company. Lieberman,M. , Lichtenberg,A.L., Principles of Plasma Discharges And Materials Processing, New York,Collision Phenomena in Ionized Gases, WileySons,Inc. Grill,A., Cold Plasma in Materials Fabrcation, IEEE Press Marr,G.V. , Plasma Spectroscopy, Elsevier Publishing Company Griem,H.R., Plasma Spectroscopy, McGraw-Hill Company				
NECESSARY COURSE MATERIALS		-				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Vacuum Science
2	Pumps
3	Investigation of Discharge Tubes
4	Thermodynamic Equilibrium
5	Midterm Exam 1
6	Thin Film Coating Systems
7	Thermionic Vacuum Arc (TVA)
8	Sputtering systems (-RF and-RF magnetron,-DC,-DC magnetron)
9	Thermal Evaporation Technique (Thermal Evaporation)
10	Midterm Exam 2
11	Evaporation Technique Vascular Electron (e - Beam Evaporation)
12	Chemical Vapor Deposition Technique [Chemical Vapor Deposition (CVD)]
13	Vascular Molecular Epitaxy Technique (Molecular beam Epitaxy, MBE)
14	General Information on Materials Analysis and Techniques
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121316357

COURSE NAME: SOLAR ENERGY-II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
6	3	0	3	5	ZORUNLU () SEÇMELİ (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM		Written	1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Solar Energy, Power Generation, semiconductors, pn junction structures, solar energy applications, semiconductor (photovoltaic) solar cells, solar cells, structure, power station with solar batteries, solar cells applications.					
OBJECTIVES OF THE COURSE		How to gain knowledge of electricity produced from solar radiation.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Solar battery technology to increase students' knowledge in areas related to work					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		REFERENCES Richard J.KOMP(2002), Pratical Photovoltaics Electricity From Solar Cells. Peter WÜRFEL(2005),Physics of Salar Cells. Roger A. HİNDRİCHS;(1996) Energy Its Use And Enviroment. Jef Poortmans and Vladimir Arkhipov (2007), Thin Films Solar Cells Fabrication, Characterization and Applications John Wiley and Sons, Ltd. Jean-Pierre Colinge and Cynthia A. Colinge (2005), Physics of Semiconductors Devices, Springer. HİNDRİCHS; Roger A.:(1996) Energy Its Use AndEnviroment. GOSWAMI, D.Yođı and KREITH, Frank, KREIDER, Jan, F; (2000) Principles of Solar Engineering,Taylor and Francis.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Energy and Energy forms
2	Solar spectrum
3	Semiconductors and the pn junction structures
4	Electrical Properties of Semiconductors
5	Midterm exam 1
6	Optical Properties of Semiconductors
7	Structural Properties of Semiconductors
8	Solar Cells Types
9	Photovoltaic Effect Photovoltaic Solar Cells
10	Midterm exam 2
11	Photovoltaic Solar Cells Types
12	Photovoltaic Solar Cells Characteristics
13	Solar Panels and Array
14	Economic of Solar Cells
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121316358

COURSE NAME: BIOPHYSICS II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	5	COMPULSORY () ELECTIVE (X)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Molecular mechanics, energy and signalization at cellular level, physical fundamentals of seeing and hearing, experimental techniques				
OBJECTIVES OF THE COURSE		Investigate and understand biological systems and processes take place in these systems by using physical concepts				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Associate the students' gained physical knowledge by investigation of phenomena taking place at biological systems				
LEARNING OUTCOMES OF THE COURSE		Fundamental knowledge on biological systems and interpretation of biological processes by physical point of view				
MAIN TEXTBOOK		Prof.Dr. Ferit Pehlivan, Biyofizik, Hacettepe-Taş, Ankara, 2005				
SUPPORTING REFERENCES		Berg, H. C. (1993). Random Walks in Biology. New Jersey: Princeton University Pres. Boal, D. (2002). Mechanics of the Cell. New York: Cambridge Pres. Gürbüz Çelebi. (1995). Biyomedikal Fizik. İzmir: Barış Yayınları Arberts B., et.al. (2002). Molecular Biology of the Cell. Garland Science. de Gennes, P-G. (1979). Scaling Concepts in Polymer Physics. Ithaca: Cornell University Press. Doi, E., Edwards, S. F. (1999). The Theory of Polymer Dynamics. Oxford: Oxford University				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Bio-filaments and properties of bio-filaments
2	Introduction to molecular mechanics; stress, strain and other deformation types
3	Deformation examples at cellular level and their applications
4	Biorheology and viscoelastic properties in biological systems
5	Midterm exam 1
6	Energy and signalization in the cell
7	Cell membrane and its mechanical properties
8	Physical fundamentals of signal transmission in nerve cells
9	Specialized cells
10	Midterm exam 2
11	Physical fundamentals of seeing
12	Physical fundamentals of hearing
13	Experimental techniques; AFM, NMR, SPR
14	Experimental techniques; optical tweezers and other micro-manipulation techniques
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	X				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		X			
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121316359

COURSE NAME: INTRODUCTION TO LASER PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	4	COMPULSORY () ELECTIVE (X)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	20	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
Other (.....)			Other (.....)			
FINAL EXAM			1	60		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application				
OBJECTIVES OF THE COURSE		The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING						
LEARNING OUTCOMES OF THE COURSE						
MAIN TEXTBOOK						
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Optoelektronik, çeviri: İbrahim Okur, Değişim Yayınları, 2000. 2. Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989. 3. Principles of Lasers, Orazio Svelto, Plenum Press, 1989. 4. Lasers Principles and Applications, J. Wilsom, J.F.B. Hawkes, Prentice Hall, 1987. 5. Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. 				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE

WEEK	SUBJECTS
1	Review of electromagnetic theory
2	Optical system, gaussian beams, optical resonator
3	Atomic radiation, laser oscillation and amplificatio
4	General characteristics of lasers, laser excitation
5	Midterm Exam 1
6	Semiconductor lasers, Solid state lasers
7	Gas lasers Dye lasers
8	Atomic lasers Molecular lasers
9	Quantum theory of the lasers; an introduction Spectroscopy of lasers; an introduction
10	Midterm Exam 2
11	Fluorescence excitation spectroscopy, laser raman spectroscopy
12	Laser spectroscopy and surface analysis with microscopy
13	Laser spectroscopy and surface analysis with microscopy Presented of application
14	Presented of application
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		x			
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121316360

COURSE NAME: SEMICONDUCTORS PHYSICS I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	4	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Band formation in solids, Solids and band structures, Semiconductors, Intrinsic and extrinsic semiconductors, Electrical conductivity and mobility, Fermi level, Conduction mechanisms, Semiconductors under electric field, Semiconductor under temperature, Semiconductors under magnetic field, Optical properties of semiconductors.				
OBJECTIVES OF THE COURSE		To realize the basics of semiconductors physics and the role of semiconductors in technology				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		1. To teach the role of semiconductors in technological applications. 2. To provide a better understanding of semiconductors in electronic and material sciences.				
LEARNING OUTCOMES OF THE COURSE		1. Knows the basic concepts and structures of semiconductors materials. 2. Knows the physical properties of semiconductor materials. 3. Knows the role of semiconductor materials in everyday life and technology.				
MAIN TEXTBOOK		John P. McKelvey, Solid State and Semiconductor Physics				
SUPPORTING REFERENCES		<ol style="list-style-type: none"> John P. McKelvey, Solid State and Semiconductor Physics Jacques I. Pankove, Optical Processes in semiconductors S. Wang, Fundamentals of Semiconductor Theory and Device Physics Prof. Dr. Kaşif ONARAN, Malzeme Bilimi 				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Band formation in solids
2	Solids and band structures
3	Semiconductors
4	Intrinsic and extrinsic semiconductors
5	Midterm Exam 1
6	Electrical properties
7	Electrical conductivity and mobility
8	Fermi level and Conduction mechanisms
9	Semiconductors under electric field
10	Midterm Exam 2
11	Semiconductor under temperature
12	Semiconductors under magnetic field
13	Optical properties of semiconductors
14	Optical properties of semiconductors
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			x		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.					
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121316361

COURSE NAME: DIGITAL ELECTRONICS-I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	4	ZORUNLU () SEÇMELİ (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
2		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	20	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	60		
MAKE UP EXAM (Oral/Written)						
PREREQUISIT(S) IF ANY						
SHORT COURSE CONTENT		Number systems, machine language programming, codes, fundamentals of Boolean algebra, advanced logic techniques and problems, logic gates				
OBJECTIVES OF THE COURSE		The main object of the course is to provide a basic understanding of digital Electronics.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING						
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Understand computer circuits and blocks 2. Learn how to simplify a logical expressions 3. Learn machine language programming 4. Identify, formulate, and solve field related problems 5. Direct correlation and application of gained knowledge with technology and industry 				
MAIN TEXTBOOK						
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Howard, M. Berlin (1985). Digital Electronics and experiments , Reston; Reston Publishing company 2. Glasford , Glenn M. (1988) . Digital Electronic circuits. London; Prentice – Hall International Editions 3. Boylestad, R. & Nashelsky, L. (1978). Electronic devices and circuit theory. New Jersey, Prentice-Hall Inc. 4. Nashelsky, L. (1977). Introduction to Digital Computer Technology. New York; John Wiley & Sons 				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Number systems
2	Number systems
3	Machine language programming
4	Machine language programming
5	Midterm Exam 1
6	Codes
7	Codes
8	Fundamentals of Boolean algebra
9	Fundamentals of Boolean algebra
10	Midterm Exam 2
11	Advanced logic techniques and problems
12	Advanced logic techniques and problems
13	Logic gates
14	Logic gates
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 1213*****

COURSE NAME: SPECTRAL ANALYSIS TECHNIQUES I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	4	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam			Midterm Exam		
	Quiz			Experimenting Performance		
	Homework	2	25	Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Spectroscopic knowlewdge, Spectroscopic measurement, Thin film growth mechanisms, spray pyrolysis technique, UV and VIR absorption spectroscopies				
OBJECTIVES OF THE COURSE		To teach the theory of spectroscopic techniques used in structure analysis. To coach equipped students for thin film technology, semiconductor films. To improve the experimental abilities of students.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To have knowledge on Spectral analysis techniques. To learn and apply thin film coating Technologies, to realize the semiconductor technology and its importance.				
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) 2. Identify, formulate, and solve field related problems 3. Design and conduct experiments as well as to analyze and interpret data 4. Interdisciplinary knowledge association and application 5. Direct correlation and application of gained knowledge with technology and industry 6. Get a recognition of the need for, and an ability to engage in life-long learning 7. Gain a knowledge of contemporary issues 				
MAIN TEXTBOOK		Instrümental Analiz, Turgut Gündüz The Materials Science of Thin Films, Milton Ohring				
SUPPORTING REFERENCES						
NECESSARY COURSE MATERIALS		Available devices in thin film production Research Laboratory and Semiconductor Characterization Research Laboratory, consumables for materials to be studied.				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Spectroscopic knowlwdge
2	Spectroscopic knowlwdge
3	Spectroscopic measurement
4	Spectroscopic measurement
5	Midterm Exam 1
6	Thin film growth mechanisms
7	Thin film growth mechanisms
8	spray pyrolysis technique
9	spray pyrolysis technique
10	Midterm Exam 2
11	spray pyrolysis technique (Laboratory application and film production)
12	spray pyrolysis technique (Laboratory application and film production)
13	UV and VIS absorption spectroscopies
14	UV and VIS absorption spectroscopies
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		X			
9	Ethical and professional responsibility.			X		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		X			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.			X		



ESOGU Physics Department Course Information Form

COURSE CODE: 121316362

COURSE NAME: INSTRUMENTAL ANALYSIS METHODS-I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
6	3	0	3	5	COMPULSORY () ELECTIVE (X)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Spectroscopic methods; beam; Absorption laws; atomic absorption spectroscopy; the ultraviolet and visible spectroscopy.				
OBJECTIVES OF THE COURSE		Information on the substance cannot be obtained with classical methods of instrumental methods to gain the theoretical knowledge that is required to obtain				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Ability to gain the benefit of classical methods of analysis that is not analyzes. In a multivariate analysis, which method / methods to use the laboratory facilities Verity decision, when the desired / required degree of accuracy to gain the ability to use such factors as the optimum.				
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Instrumental methods of analysis identify, describe and classify the importance. 2. Describes the wave and particle character of Ray, associate and analyze them. 3. Describes the events that may occur as a result of interaction of matter-radiation. 4. Compare the spectra of atomic and molecular absorption and comments. 5. Instrumental methods of data tell the indispensability of taking the necessary theoretical knowledge. 6. Spectroscopic methods, explains the differences / similarities are discussed. 7. Atomic absorption spectroscopy identifies, explains the principles, tell the differences. 8. AAS obtained by the analysis result and the advantages discussed. 9. Explains and interprets, spectroscopy of ultraviolet and visible region. 10. Examines and interprets the changes in material properties as a result of electronic transitions. 				
MAIN TEXTBOOK		Gündüz, T., "İnstrumental Analiz", Gazi Kitabevi, 2002.				
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Erdik,E."Organik Kimyada Spektroskopik Yöntemler"Gazi Kitabevi, 1998. 2. Douglas, A., Skoog, F., Holler, J., Nieman, T. A., "Principles of Instrumental Analysis", Saunders College Publishing, 1998. 				
NECESSARY COURSE MATERIALS		Computer, projector				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	The physical properties of matter and radiation; Matter-Radiation Interactions: Absorption of photons
2	Absorption Laws; Lambert-Beer's Law; Applications
3	Atomic Absorption Spectroscopy, flame or arc events occurring temperature
4	Rays emitted by the atom and the energy levels;
5	Midterm Exam 1
6	Quantum levels and the excited atoms
7	Initiatives, the determination, the determination of sodium
8	UV-VIS (Electronics) Spectroscopy
9	Molecular Orbitals, and the Calculation of Transition Energies
10	Midterm Exam 2
11	Factors that change the electronic transitions;
12	Environmental Impact
13	Explanation of Spectrum
14	Inorganic electronic spectroscopy
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.			X		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.			X		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317555

COURSE NAME: APPLICATIONS OF LASER

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	3	0	3	5	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)							
PREREQUISIT(S) IF ANY							
SHORT COURSE CONTENT		The main aim of the course is Teaching of Laser application, Learning of Laser application, Apply knowledge of natural sciences					
OBJECTIVES OF THE COURSE		The main aim of the course is Teaching of Laser application, Learning of Laser application, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application, Use new technology and modern techniques such as computer and computer software to analyze					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING							
LEARNING OUTCOMES OF THE COURSE		, Use new technology and modern techniques such as computer and computer software to analyze and					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		1. Laser Principles and Application, J. Wilson, J.F.B. Hawkes, Prentice Hill, 1989. 2. Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. 3. Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989. 4. Principles of Lasers, Orazio Svelto, Plenum Press, 1989. 5. Enstrümental Analiz İlkeleri, Douglas A. Skoog, F. James Holler, Timothy A. Niemann, Bilim Yayıncılık, 1997.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Semiconductor lasers and industrial application
2	Medical application of Semiconductor lasers
3	Industrial application of solid state lasers
4	Medical application of solid state lasers Industrial and medical application of gas lasers
5	Midterm exam 1
6	Industrial and medical application of dye lasers Industrial and medical application of atomic lasers
7	Midterm Exam
8	Midterm Exam
9	Industrial and medical application of molecular lasers Industrial application of laser spectroscopy
10	Midterm exam 1
11	Industrial application of laser spectroscopy Medical application of laser spectroscopy
12	Medical application of laser spectroscopy Investigated of industrial application and presentation
13	Investigated of industrial application and presentation
14	Investigated of medical application and presentation Investigated of medical application and presentation
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		X			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		X			
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.					
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.					
12	To have knowledge about the modern problems that are local and global.					



ESOGU Physics Department Course Information Form

COURSE CODE: 121317556

COURSE NAME: SEMICONDUCTORS PHYSICS II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	3	0	3	5	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		pn junctions, Static current-voltage characteristics of pn junction diodes, Electrical breakdown in pn junctions, Zener diode, Dynamic behavior of pn junction diodes, Tunnel diode, Schottky barrier diode, Ohmic contacts, Heterojunctions, Semiconductor Optoelectronic devices, Bipolar junction transistors, Junction and metal-semiconductor field effect transistors, MOS transistors				
OBJECTIVES OF THE COURSE		To realize the importance and position of semiconductor devices in technology.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		1. To teach the role of semiconductor devices in technological applications. 2. To provide a better understanding of semiconductor devices in electronic and material sciences.				
LEARNING OUTCOMES OF THE COURSE		4. Knows the basic concepts and structures of semiconductor devices. 5. Knows the physical properties of semiconductor devices. 6. Knows the role of semiconductor devices in everyday life and technology.				
MAIN TEXTBOOK		M. S. Tyagi, Introduction to semiconductor materials and devices				
SUPPORTING REFERENCES		5. M. S. Tyagi, Introduction to semiconductor materials and devices 6. M. Shur, Physics of semiconductor devices 7. R. Boylestad, L. Nashelsky, Electronic devices and circuit theory 8. J. Singh, Semiconductor optoelectronics				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	pn junctions
2	pn junctions
3	Static current-voltage characteristics of pn junction diodes
4	Electrical breakdown in pn junctions and Zener diode
5	Midterm Exam 1
6	Dynamic behavior of pn junction diodes
7	Tunnel diode and Schottky barrier diode
8	Ohmic contacts
9	Heterojunctions
10	Midterm Exam 2
11	Semiconductor Optoelectronic devices
12	Bipolar junction transistors
13	Junction and metal-semiconductor field effect transistors
14	MOS transistors
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			x		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317557

COURSE NAME: INSTRUMENTAL ANALYSIS METHODS-II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	3	0	3	5	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM		Other (.....)		Other (.....)			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Infrared (Vibration) spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, Electron Paramagnetic Resonance (EPR) spectroscopy, X-Ray Spectroscopy					
OBJECTIVES OF THE COURSE		Information on the substance cannot be obtained by conventional methods to obtain some instrumental methods to gain the necessary theoretical knowledge and application.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Ability to gain the benefit of classical methods of analysis that is not analyzes. In a multivariate analysis, which method / methods to use the laboratory facilities Verist decision, when the desired / required degree of accuracy to gain the ability to use such factors as the optimum.					
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Infrared spectroscopy identifies, indicates that explains the principles and practice. 2. Explains and interprets events in a conventional quantum mechanical model. 3. IR spectroscopy identifies and applies the rules of selectivity. 4. Describes the discovery and molecular structure determination of the frequency band. 5. Determined by IR spectroscopy describes how an unknown substance. 6. Spectroscopic methods, explains the differences / similarities are discussed. 7. Nuclear Magnetic Resonance spectroscopy identifies, explains the principles, says the differences. 8. Discusses the results and benefits obtained by NMR analysis. 9. Explains and interprets the EPR spectroscopy. 10. Examines and interprets the changes in material properties as a result of diffraction methods. 					
MAIN TEXTBOOK		Gündüz, T., "İnstrumental Analiz", Gazi Kitabevi, 2002.					
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Erdik,E."Organik Kimyada Spektroskopik Yöntemler"Gazi Kitabevi, 1998. 2. Douglas, A., Skoog, F., Holler, J., Nieman, T. A., "Principles of Instrumental Analysis", Saunders College Publishing, 1998. 					
NECESSARY COURSE MATERIALS		Computer, projector					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Infrared spectroscopy, Vibration Model, vibration Quantum
2	Molecular vibrations, the IR-active agents,
3	IR spectral regions, the presence of Frequency band
4	Changes affect the Group Frequencies
5	Midterm Exam 1
6	Solvents used for IR spectroscopy and sample preparation technique
7	structure analysis
8	Nuclear magnetic resonance spectroscopy, quantum law, relaxation processes
9	Chemical shift, analytical applications,
10	Midterm Exam 2
11	Electron paramagnetic resonance spectroscopy (EPR)
12	EPR applications
13	X-ray spectroscopy
14	Experimental diffraction methods
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.			X		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.			X		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317558

COURSE NAME: DIGITAL ELECTRONICS-II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	3	0	3	5	ZORUNLU () SEÇMELİ (s)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (✓) if the course include design significantly]		General Education	Social		
2		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	20	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Multivibrator circuits, Counter and data transfer registers, computer timing and control, computer memory, arithmetic operations, input/output operations					
OBJECTIVES OF THE COURSE		The main object of the course is to provide a basic understanding of digital Electronics.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING							
LEARNING OUTCOMES OF THE COURSE		6. Learn Multivibrator circuits 7. Understand Counter and data transfer registers 8. Identify, formulate, and solve field related problems 9. Direct correlation and application of gained knowledge with technology and industry 10. Gain a knowledge of contemporary issues					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		1. Howard, M. Berlin (1985) . Digital Electronics and experiments , Reston; Reston Publishing company 2. Glasford , Glenn M. (1988) . Digital Electronic circuits. London; Prentice – Hall International Editions 3. Boylestad, R. & Nashelsky, L. (1978) . Electronic devices and circuit theory. New Jersey, Prentice-Hall Inc. Nashelsky, L. (1977) . Introduction to Digital Computer Technology. New York; John Wiley & Sons					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Multivibrator circuits
2	Multivibrator circuits
3	Counter and data transfer registers
4	Counter and data transfer registers
5	Midterm Exam 1
6	Computer timing and control
7	Computer timing and control
8	Computer memory
9	Computer memory
10	Midterm Exam 2
11	Arithmetic operations, input/output operations
12	Arithmetic operations, input/output operations
13	Arithmetic operations, input/output operations
14	Arithmetic operations, input/output operations
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317559

COURSE NAME: INTRODUCTION TO COSMOLOGY

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	3	0	3	5	COMPULSORY () ELECTIVE (X)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	20	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	60		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Observational data of cosmology, aim of cosmology, problem of evaluation of distences in cosmology, Hubble’s law, astronomical data outside of optics, density of universe, theoretical cosmology, metric and knematics of theorotical model, dynamics of theoretical model, special universe models, Big bang.				
OBJECTIVES OF THE COURSE		To introduce both basics of cosmology and the physics of universe.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Students will learn how to examine structure of the universe based on the principles of cosmology and relativity.				
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Learn knowledge about structure of the universe. 2. Learn knowledge about relativity, cosmology, and astrophysics. 3. Apply knowledge of natural sciences (Mathematics, Physics). 4. Justify and analyze natural phenomena. 5. Identify, formulate, and solve field related problems. 6. Design and conduct experiments as well as to analyze and interpret data. 7. Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems. 8. Interdisciplinary knowledge association and application. 9. Get an understanding of professional and ethical responsibility. 10. Get recognition of the need for, and an ability to engage in life-long learning. 11. Gain knowledge of contemporary issues. 				
MAIN TEXTBOOK		Özemre, A.Y., “Kozmolojiye Giriş”, İstanbul Üniversitesi Fen Fakültesi Yayınları, İstanbul, 1981.				
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Ryden B., “Introduction to cosmology”, Addison Wesley, New York, 2003. 2. Esin, F., “Görsel Uzay ve Kozmolojiye Giriş”, İstanbul Üniversitesi Yayınları, İstanbul, 1993. 3. Peebles, P. J. E., “Principles of Physical Cosmology”, Princeton University Press, Princeton, 1993. 4. Saama, D. W., “Modern Cosmology”, Cambridge University Press, Cambridge, 1971. 				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Observational data of cosmology
2	Aim of cosmology
3	Problem of evaluation of distances in cosmology
4	Hubble's law
5	Midterm Exam 1
6	Astronomical data outside of optics
7	Theoretical cosmology
8	Metric and kinematics of theoretical model
9	Dynamics of theoretical model
10	Midterm Exam 2
11	Special universe models
12	Big bang
13	Cosmic microwave background radiation
14	Inflation and the early universe
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.				x	
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317560

COURSE NAME: RENEWABLE ENERGY RESOURCES

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	3	0	3	5	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Fossil and Renewable Energy, Geenhouse Effect and Environment, Energy and Population, Solar spectrum, Solar termal energy, Solar cells, Wind, Biomass, Biogas, Hyrdogen energies, Economic aspects about renewable energies					
OBJECTIVES OF THE COURSE		Renewable Energies recognize, inform you about global warming					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Learn to recognize and use of Renewable Energies and their technologies					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		HINDRICHS; Roger A.:(1996) Energy Its Use AndEnviroment. GOSWAMI, D.Yogi and KREITH, Frank, KREIDER, Jan, F; (2000) Principles of Solar Engineering, Taylor and Francis.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Fossil and Renewable Energy,
2	Energy and Population,
3	Greenhouse Effect and Environment
4	Solar spectrum
5	Midterm exam 1
6	Solar thermal energy
7	Solar thermal energy
8	Solar cells,
9	Solar cells, Hydrogen
10	Midterm exam 2
11	Wind,
12	Biomass,,
13	Biogas,
14	Economic aspects about renewable energies
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317561

COURSE NAME: MICRO PROCESSORS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	3	0	3	5	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	20	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Introduction to microprocessors, Software and hardware at microprocessor, Software and hardware structure, Minimum microprocessor configuration, programmes and command list of the 8085 CPU					
OBJECTIVES OF THE COURSE		The main object of the course is to provide a basic understanding of Microprocessors.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING							
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Understand Microprocessors. 2. 8080/8085/8088 and 80286/80386 microprocessors learning 3. Learning the internal structure of microprocessors 4. Microprocessor applications. 					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Hayes, John P. (1984). Digital System Design and Microprocessors 2. Boylestad, R. & Nashelsky, L. (1978). Electronic devices and circuit theory, New- Jersey, Prentice-Hall Inc. 3. Nashelsky, L. (1977). Introduction to Digital Computer Technology. New York; John Wiley & Sons 					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to microprocessors
2	Software and hardware at microprocessor
3	Software and hardware at microprocessor
4	Software and hardware structure
5	Software and hardware structure
6	Midterm Exam 1
7	Minimum microprocessor configuration
8	Minimum microprocessor configuration
9	Programmes and command list of the 8085 CPU
10	Midterm Exam 2
11	Programmes and command list of the 8085 CPU
12	Programmes and command list of the 8085 CPU
13	Programmes and command list of the 8085 CPU
14	Programmes and command list of the 8085 CPU
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317562 **COURSE NAME:** INTRODUCTION TO ELEMENTARY PARTICLE PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	3	0	3	5	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	20	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Historical view to elementary particles; classification of elementary particles; fundamental interactions; symmetries and conservation laws; the quark model; the standard model; relativistic kinematics; bound states; particle accelerators and their various applications.					
OBJECTIVES OF THE COURSE		To introduce high energy and particle physics. It is also aimed to introduce micro constituents of matter and fundamental interactions.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Students will learn elementary particles and their interaction mechanisms in the micro universe.					
LEARNING OUTCOMES OF THE COURSE		<ul style="list-style-type: none"> 12. Learn knowledge about micro constituents of matter. 13. Realize the fundamental forces and their interactions. 14. Apply knowledge of natural sciences (Mathematics, Physics). 15. Justify and analyze natural phenomena. 16. Identify, formulate, and solve field related problems. 17. Design and conduct experiments as well as to analyze and interpret data. 18. Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems. 19. Interdisciplinary knowledge association and application. 20. Direct correlation and application of gained knowledge with technology and industry. 21. Get an understanding of professional and ethical responsibility. 22. Get recognition of the need for, and an ability to engage in life-long learning. 23. Gain knowledge of contemporary issues. 					
MAIN TEXTBOOK		Griffiths, D. "Introduction to elementary particles", Wiley-Vch, Weinheim, 2008.					
SUPPORTING REFERENCES		<ul style="list-style-type: none"> 1. Perkins, D.H., "Introduction to high energy physics", Addison-Wesley, MA, 1982. 2. Frauenfelder, H. Henley, E. M., "Subatomic physics", Prentice Hall, New Jersey, 1991. 3. Martin, B. R. & Shaw, G., "Particle Physics", John Wiley&Sons, 					

	New York, 1992.
NECESSARY COURSE MATERIALS	
COURSE SCHEDULE	
WEEK	SUBJECTS
1	Historical view to elementary particles
2	Classification of elementary particles
3	Fundamental interactions
4	Conservation laws
5	Midterm Exam 1
6	The quark model
7	The standard model
8	Relativistic kinematics
9	Symmetries
10	Midterm Exam 2
11	Bound states
12	Fundamental physical properties of the particle accelerators
13	Applications of the particle accelerators
14	Neutrino oscillations
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.				x	
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317563

COURSE NAME: X-RAYS AND APPLICATIONS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	3	0	3	5	COMPULSORY () ELECTIVE (X)	
Please depict the credit (for non-credit courses, number of course hours per week) of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY						
SHORT COURSE CONTENT		Definition of a crystal, Crystalline ve amorphous solids, Production and dedection of x-rays, Properties of x-rays, x-ray source, X-ray diffraction by electrons and atoms, Miller Indices, Laue, Powder and Rotating crystal methods, X-ray safety and protection				
OBJECTIVES OF THE COURSE		Properties and production of x-rays				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To use of x-rays in and plasma manufacturing systems				
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues				
MAIN TEXTBOOK						
SUPPORTING REFERENCES		REFERENCES Culllity, B.D. and Stock, S.R. ,(2001) Elements of X-Ray Diffraction, Pearson Prentice Hall, New Jersey, A.B.D. Culllity, B.D. , (1978) Elements of X-Ray Diffraction, Addison-Wesley. Suryanarayanaand ,C. And Norton M. Grant , (1998), Plenum Press, New York. Klung, P. Harold, and Alexander, Leroy E. ,(1954) X-Ray Diffraction,				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Definition of a crystal,
2	Crystalline ve amorphous solids,
3	Production of x-rays,
4	Dedection of x-rays,
5	Midterm exam 1
6	Properties of x-rays,
7	x-ray sources,
8	X-ray scattering by electrons,
9	X-ray scattering by atoms, Miller Indices,
10	Midterm exam 2
11	Powder method,
12	Rotating crystal methods
13	Powder Diffraction patterns
14	X-ray safety and protection
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317564

COURSE NAME: ANALOG ELECTRONICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE		
	Theory	Tutorial	Credit	ECTS	TYPE
7	3	0	3	5	ZORUNLU () SEÇMELİ (x)
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).					
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social
3		()			

MEASURING AND EVALUATION ACTIVITIES	THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	20	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM		1	60			
MAKE UP EXAM (Oral/Written)	Written					
PREREQUISIT(S) IF ANY	-					
SHORT COURSE CONTENT	Semiconductor materials, diodes, transistors and opamp applications, pressure, flow, sound and heat sensors and their general applications in physics.					
OBJECTIVES OF THE COURSE	The main object of the course is to provide a basic understanding of Analog Electronics.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING						
LEARNING OUTCOMES OF THE COURSE	<p>By the end of this module students will be able to:</p> <ol style="list-style-type: none"> 1. Ability to analyze analog electronic circuits. 2. Ability to design analog electronic circuits. 3. Analog Electronic applications. 4. Associate the gained knowledge, analyze and interpret data. 5. Correlate and apply gained knowledge directly with technology and industry. 					
MAIN TEXTBOOK						
SUPPORTING REFERENCES	<ol style="list-style-type: none"> 1. Hamilton, S. (2003). Analog Electronics Companion : Basic Circuit Design for Engineers and Scientists. New York; Cambridge University Press 2. Robert Boylestad , Nashelsky, L. (1978) . Electronic devices and circuit theory. New Jersey; Prentice-Hall 3. Millman, J.& Halkias, C.C. (1967). Electronic devices and circuits. New York; Mc Graw - Hill 4. Hamilton, S. (2003). Analog Electronics Companion : Basic Circuit Design for Engineers and Scientists. New York; Cambridge University Press 5. Robert Boylestad , Nashelsky, L. (1978) . Electronic devices and circuit theory. New Jersey; Prentice-Hall 					
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE

WEEK	SUBJECTS
1	Semiconductor materials
2	Diyotes
3	Diyot applications
4	Transistors
5	Midterm Exam 1
6	Transistor applications
7	Operational amplifiers (opamps)
8	Opamp applications
9	Pressure sensors
10	Midterm Exam 2
11	Flow sensors

12	Sound sensors
13	Heat sensors
14	Their general applications in physics
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317565

COURSE NAME: ATOMIC AND MOLECULAR PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	4	0	4	7	COMPULSORY (X) ELECTIVE ()	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM		1	50			
MAKE UP EXAM (Oral/Written)	Written					
PREREQUISIT(S) IF ANY	-					
SHORT COURSE CONTENT	Obtaining eigenfunctions and eigenvalues in hydrogen and hydrogen-like atoms, investigation of interaction mechanisms in two-particle atoms					
OBJECTIVES OF THE COURSE	Investigation of an atomic system at undergraduate level by using modern atom theory					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING	Associate the students' gained physical knowledge by investigation of phenomena taking place at atomic level					
LEARNING OUTCOMES OF THE COURSE	Application of quantum mechanical knowledge, manifestation of difference between quantum mechanics and classical mechanics					
MAIN TEXTBOOK	Atom ve Molekül Fiziği, Prof.Dr. Erol Aygün ve Prof.Dr. Mehmet Zengin, Bilim Yayıncılık, Ankara, 2005					
SUPPORTING REFERENCES	Atom ve Molekül Fiziği, B. H. Bransden (Çeviri: F. Köksal ve H. Gümüş), Bilim Yayıncılık, Ankara, 1999 Fenciler için Kuantum Mekaniği, Prof.Dr. Fevzi Köksal ve Dr. Rahmi Köseoğlu, Nobel Yayın Dağıtım, Ankara, 2006 Kuantum Fiziği I-II, Prof.Dr. Abdulhalik Karabulut ve Prof.Dr. Gökhan Budak, Nobel Yayın Dağıtım, Ankara, 2007 Kuantum Mekaniğine Giriş, Bekir Karaoğlu, Seyir Yayıncılık, İstanbul, 2003 Atom ve Molekül Fiziği Problemleri ve Çözümleri, Prof.Dr. Mehmet Zengin, Doç.Dr. Ali Yaman ve Dr. R. Gökhan Türeci, Bilim Yayıncılık, Ankara, 2008					
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to atomic and molecular physics: Atomic models and quantum mechanical concepts
2	Introduction to solution of hydrogen and hydrogen-like atom in spherically symmetric potential
3	Obtaining spherical harmonics solution and investigation in different conditions
4	Obtaining radial wave function solution and investigation in different conditions
5	Midterm exam 1
6	Solution of general wave equation and eigenvalues; investigation of probability distribution and expected values with examples
7	Dirac notation, quantum numbers and relation with degeneracy, parity analysis
8	Concept of angular momentum and investigation of angular momentum types, angular momentum interactions in hydrogen and hydrogen-like atoms and perturbation terms
9	Obtaining Pauli spin matrices and general angular momentum matrices and their applications
10	Midterm exam 2
11	Spin-orbit interaction in hydrogen atom and fine structure term
12	Magnetic dipole-dipole interaction in hydrogen atom and hyperfine structure term
13	Investigation of interactions in strong and weak field
14	Electric dipole selection rules
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	X				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.				X	
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		X			
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317566

COURSE NAME: SOLID STATE PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	4	0	4	7	COMPULSORY (x) ELECTIVE ()	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
4		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Crystal structure of solids, Reciprocal lattice, X-ray diffraction, Crystal binding, Phonons I: Crystal vibrations, Phonons II: Thermal properties, Free electron Fermi Gas.				
OBJECTIVES OF THE COURSE		To teach basics of solid state physics, physical properties of metal and insulator materials and the role of solid state physics in technology.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		1. To teach the role of physical properties of solids in technological applications. 2. To provide a better understanding of electronic and material sciences.				
LEARNING OUTCOMES OF THE COURSE		7. Knows the basic concepts and crystalline structures of solid materials. 8. Knows the crystal structure analysis of solids. 9. Knows the physical properties of metal and insulating materials. 10. Knows the role of metal and insulating materials in everyday life and technology.				
MAIN TEXTBOOK		Kathal Fiziğine Giriş (KITTEL), çeviri: B. Karaoğlu, ARTE-Bilgi Tk, 1996.				
SUPPORTING REFERENCES		1. Kathal Fiziğine Giriş, Prof.Dr. Tahsin Nuri Durlu, AÜ 11. Kathal Fizigi, J.R. HOOK & H.E. Hall, çeviri: F. Köksal, M. Altunbaş, M. Dinçer. 12. Elementary Solid State Physics, M. Ali Omar, 1993.				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Periodic Array of Atoms, Symmetry operations, Lattice types
2	Occupancy ratio, Miller indices, Simple crystal structures, Nonideal crystal structures
3	Diffraction of Waves by Crystals, X-ray diffraction, Electron diffraction, Neutron diffraction, Bragg's law
4	Reciprocal lattice, Diffraction condition, Laue's equations and Ewald sphere
5	Midterm Exam 1
6	Brillouin zones ve determination of first Brillouin zone for cubic structures, Structure factor
7	Interatomic forces and bindings, Crystals of Inert Gases, Ionic Crystals, Metallic Crystals and Covalent Crystals
8	Lattice vibrations, Crystals with Monatomic Basis, Two Atoms per Primitive Basis
9	Density of states, dielectric function, Inelastic Scattering by Phonons
10	Midterm Exam 2
11	Phonon Heat Capacity, Einstein's model, Debye's model, Thermal conductivity, Umklapp effects
12	Free electron Fermi Gas, Energy Levels in One Dimension, Fermi-Dirac distribution function
13	Free Electron Gas in Three Dimensions, Heat Capacity of the Electron Gas, Electrical Conductivity and Ohm's Law, Thermal Conductivity of Metals
14	Dielectric function of electron gas, Motion in Magnetic Field, Hall effect
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			x		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317567

COURSE NAME: NUCLEAR PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	4	0	4	7	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week) of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	20	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		Electromagnetic Theory I & II, Quantum Physics I & II					
SHORT COURSE CONTENT		Nuclear terminology, history of nuclear science, nuclear reactions, nuclear fission, reactors					
OBJECTIVES OF THE COURSE		Understanding the radioactivity and nuclear reactions, fission, and studying their applications in energy production					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		We aimed at introducing students to professions which are directly related to the nuclear physics by giving details of application areas of nuclear physics and organizing seminars in this area.					
LEARNING OUTCOMES OF THE COURSE		Learn radiation, biological effects of radiation; explain how a nuclear reactor works.					
MAIN TEXTBOOK		Hore-Lacy, Ian. Nuclear Energy in the 21st Century. 7th. London: World Nuclear Press, 2006.					
SUPPORTING REFERENCES		“Nuclear Physics I and II” K. S. Krane, 1988, John Wiley & Sons, Inc. J. K. Shultis and R. E. Faw, Fundamentals of Nuclear Science and Engineering, 2nd ed., CRC Press, 2008.					
NECESSARY COURSE MATERIALS		Nuclear Physics Research Lab.					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction, course goals, grading, texts, uses of energy worldwide
2	Basic science and technology, energy units and conversions
3	Nuclear energy: Balancing the benefits and risks
4	Early history of nuclear science, discovery of radioactivity and its impact on science
5	Midterm exam 1
6	The Manhattan project and its legacy
7	Nuclear radiation and radioactive half-life, biological effects of radiation
8	Characteristics of fission, energy in fission
9	Controlled fission reactors, reactor types
10	Midterm exam 2
11	Boiled water reactors, pressurized water reactors
12	Natural nuclear reactors
13	Students seminars
14	Students seminars
15,16	Final exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modeling and solving of physics problems by the theoretical and experiential information about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modeling method for the complex physics problems about physics and related areas.	X				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and awareness about sustainable development, innovativeness, entrepreneurship.		X			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that is local and global.	X				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317568

COURSE NAME: COLOR AND LIGHT FILTERS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	1	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework	1	25	Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Concepts of light and color, Light models, Color diagrams,Dispersion techniques of white light,Color models, Dispersion techniques of white light, Light filter overview, Types of color filters.					
OBJECTIVES OF THE COURSE		The main aim of the course is to teach the importance and usage of light, color and light filters.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Design and conduct experiments as well as to analyze and interpret data. Direct correlation and application of gained knowledge with technology and industry. Interdisciplinary knowledge association and application.					
LEARNING OUTCOMES OF THE COURSE		Learning concepts of light and color. Learning light models and color diagrams. Learn color models and dispersion techniques of white light.					
MAIN TEXTBOOK		Ghatak,A., (1987) , Optics, Tata McGraw-Hill Publishing Co.Ltd.,New Delhi					
SUPPORTING REFERENCES		Heckt,E., (1999) , Optik, (Çev:Armağan,N.), Akademi yayını,İSTANBUL Kılıç,G., (2000) ,Işık filtreleri ve filtrelerden geçen ışığın özellikleri, Yüksek Lisans Tezi, ESOGU.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Concepts of light and color
2	Light models
3	Color diagrams
4	Dispersion techniques of white light
5	Midterm Exam 1
6	Color models
7	Light filter overview
8	Types of color filters
9	Application of light filters
10	Midterm Exam 2
11	Importance of light filters
12	Types of light filters
13	Types of light filters
14	Types of light filters
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		X			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			X		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			X		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.			X		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.				X	
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.				X	
12	To have knowledge about the modern problems that are local and global.			X		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317569

COURSE NAME: PLASMA TECHNIQUES

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM	Activity type		Number	%	Activity type	Number	%
	Midterm Exam		2	25	Midterm Exam		
	Quiz				Experimenting Performance		
	Homework				Reporting		
	Project				Oral Exam or Quiz		
Other (Internship)				Other (.....)			
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Thin-film deposition techniques and their use in industry and science facilities, evaluation of the results of the studies performed analyzes.					
OBJECTIVES OF THE COURSE		Comprehend the basics of plasma techniques.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		The Importance of Technique in the Field of Plasma Physics. The Importance of Plasma Applications in industry and technology.					
LEARNING OUTCOMES OF THE COURSE		Learning the techniques of thin-film storage using different materials, uses of the resulting movie industry and technology learning.					
MAIN TEXTBOOK		Ekem, N. Musa, G., Akan, T (2001), Plasma Physics Lecture Notes, Eskisehir.					
SUPPORTING REFERENCES		Roth,A. (1995) , Vacuum Technology, Amsterdam: Elsevier Publishing Company. Lieberman,M. , Lichtenberg,A.L., Principles of Plasma Discharges And Materials Processing, New York, Wiley-Interscience Publication McDaniel, E.W. (1964) , Collision Phenomena in Ionized Gases, WileySons,Inc. Grill,A. (1993), Cold Plasma in Materials Fabrcation, IEEE Press Marr,G.V. (1968) , Plasma Spectroscopy, Elsevier Publishing Company Griem,H.R., Plasma Spectroscopy, McGraw-Hill Company					
NECESSARY COURSE MATERIALS		Plasma Physics and Technology Research Laboratory.					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	General Information About Plasma
2	General Information About Vacuum
3	Introduction and Application of Pumps
4	General Information on Applications of Plasma Technology and the industry
5	Midterm Exam 1
6	General Information on Types and Characteristics of Electrical Discharge
7	General Information on Coating Systems
8	Thermionic Vacuum Arc (TVA) System
9	Sputtering systems (RF and RF magnetron, DC, DC magnetron)
10	Midterm Exam 2
11	Evaporation Technique Beam Electron (e - Beam Evaporation)
12	Thermal Evaporation Technique (Thermal Evaporation)
13	Chemical Vapor Deposition Technique [Chemical Vapor Deposition (CVD)]
14	Beam Molecular Epitaxy Technique (Molecular beam Epitaxy, MBE)
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317570

COURSE NAME: SUPERCONDUCTORS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		History of Superconductivity, Properties of normal state, Crystal structure, electrical conductivity, Meissner effect, London equation and solution.					
OBJECTIVES OF THE COURSE		To give basic information about superconductors.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects.					
LEARNING OUTCOMES OF THE COURSE		To follow the investigations on superconductors.					
MAIN TEXTBOOK		Poole, C. H., Prozorov, R., (2007). Superconductivity.					
SUPPORTING REFERENCES		Serway, R. A., (1996). Fen ve Mühendislik için Fizik, III.Cilt Kittel, C., (1996). Katıhal Fiziğine Giriş (Translated) Burns, G., (1992). High-Temperature Superconductivity					
NECESSARY COURSE MATERIALS		Face to face					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	History of superconductivity
2	Properties of normal state and crystal structure
3	Electrical conductivity
4	Thermal conductivity
5	Midterm Exam 1
6	Energy gap and effective mass
7	Zero resistance and transition temperature
8	Meissner effect
9	Perfect diamagnetism
10	Midterm Exam 2
11	Critical field and current
12	Two fluid model
13	London equations
14	The solutions of London equations
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	x				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	x				
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317571

COURSE NAME: LIQUID STATE PHYSICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	0	6	3	8	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week) of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (Internship)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Description of the structure of Non-Crystalline Systems, A comparison of the Structure of the Liquid and Amorphous States with the Crystal and gaseous States, Theories for the Structure of Non-Crystalline Materials, Analysis of X-Ray, Neutron and Electron Diffraction, Separation of Partial Structures in a binary Non-Crystalline system, Pure Metals, Binary Alloys, Structural Models, partial Structures, Liquid Semiconductors, Distribution functions of Liquid metals, Distribution functions of Liquid Alloys.				
OBJECTIVES OF THE COURSE		Crystal structural analysis of nonlinear systems, analysis of non-crystalline materials, construction techniques used to teach the structure of liquid metals and alloys				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Importance of Liquid Physics theory and applications in the field of industry and technology				
LEARNING OUTCOMES OF THE COURSE		Studies of Liquid metal and alloys structures, comment of Non-Crystalline materials structure analysis.				
MAIN TEXTBOOK		The Structure of Non-Crystalline Materials, Yoshio WASEDA McGraw-Hill, 1980, New York.				
SUPPORTING REFERENCES		Introduction to the Theory of Liquid Metals, T.E. FABER, Cambridge University 1972 London.				
NECESSARY COURSE MATERIALS		-				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Description of the structure of Non-Crystalline Systems, ,
2	A comparison of the Structure of the Liquid and Amorphous States with the Crystal and gaseous States
3	Theories for the Structure of Non-Crystalline Materials
4	Analysis of X-Ray, Neutron and Electron Diffraction
5	Midterm Exam 1
6	Separation of Partial Structures in a binary Non-Crystalline system
7	Pure Metals
8	Binary Alloys
9	Structural Models
10	Midterm Exam 2
11	Partial Structures
12	Liquid Semiconductors
13	Distribution functions of Liquid metals
14	Distribution functions of Liquid Alloys
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		X			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317572 **COURSE NAME:** SEMICONDUCTORS FILM PRODUCTION TECHNIQUE-I

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	0	6	3	8	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES		
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	25	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Crystal Structure, Intrinsic and Extrinsic Semiconductors, Energy Bands, Holes in Semiconductors, Defect Levels in Semiconductors, Optical Properties and Electrical Properties of Semiconductors, pn Junction Structures Bias of pn Junction, Metal-Semiconductor Contacts, Metal-Semiconductor Ohmic Contacts				
OBJECTIVES OF THE COURSE		Semiconductor thin films to examine some of the features as a theoretical				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To obtain information about the production of semiconductor thin films				
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues				
MAIN TEXTBOOK						
SUPPORTING REFERENCES		REFERENCES Jasprit, Singh;(1995) Semiconductor Optoelectronics, Physics and Technology, McGraw-Hill Series McKELVEY, John P.;(1966) Solid State and Semiconductor Physics, A Harper International Edition SZE, S.M.;(1981) Semiconductor Devices TYAGI, M.S.; (Introjunction Semiconductor Materials and Devices, John Wiley and Sons				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE

WEEK	SUBJECTS
1	Crystal Structure
2	Semiconductor and Semiconductor Films
3	Intrinsic and Extrinsic Semiconductors
4	Undoped and Doped Semiconductors
5	Midterm Exam 1
6	Energy Bands
7	Holes in Semiconductors
8	Defect Levels in Semiconductors
9	Optical Properties of Semiconductors Electrical Properties of Semiconductors
10	Midterm Exam 2
11	pn Junction Structures
12	Bias of pn Junction
13	Metal-Semiconductor Contacts
14	Metal-Semiconductor Ohmic Contacts
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317573

COURSE NAME: ELECTRONIC CIRCUIT DESIGN

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Introduction to circuit simulated programmes, Electronic Circuits with circuit simulated programmes analysis (Electronic work bench)					
OBJECTIVES OF THE COURSE		The main objective of the course, the design of electronic circuits to perform the operation on computer.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Circuit design to make the computer environment and students to see the operation of the circuit will give a different perspective.					
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Understand Circuit Design. 2. Circuit Design applications. 3. Associate the gained knowledge, analyze and interpret data. 4. Direct correlation and application of gained knowledge with technology and industry. 5. Gain a knowledge of contemporary issues 					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. <i>Peter H. Beards(1987)</i>, Analog and digital electronics. 2. <i>Jacob Millman ; Christos C. Halkias(1987)</i>, Integrated electronics : analog and digital circuits and systems 3. Any equivalent book 					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Examination of the circuit simulation programs
2	Features of Multisim circuit simulation program
3	Circuit design with Multisim
4	Various applications
5	Various applications
6	Midterm Exam 1
7	Various applications
8	Various applications
9	Various applications
10	Midterm Exam 2
11	Various applications
12	Various applications
13	Various applications
14	Various applications
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.			x		
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.			x		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317574

COURSE NAME: DIELECTRICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM	Activity type		Number	%	Activity type	Number	%
	Midterm Exam				Midterm Exam		
	Quiz				Experimenting Performance		
	Homework		1	40	Reporting		
	Project				Oral Exam or Quiz		
Other (.....)				Other (.....)			
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Electrical Conduction of Dielectrics, Electrical Conduction of Metals, Superconductivity and Hyperconductivity, Surface Conduction of Dielectrics, Polarization of Dielectrics, Dependence of Permittivity on Various Factors, Mechanical Forces in Dielectrics in an Electric Field.					
OBJECTIVES OF THE COURSE		Properties of Dielectrics					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Importance of Dielectrics					
LEARNING OUTCOMES OF THE COURSE							
MAIN TEXTBOOK		Physics of Dielectric Materials, B., TAREEV, Moscow, 1975.					
SUPPORTING REFERENCES		Physics, R.A. Serway, Philadelphia, 1992.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Electrical Conduction of Dielectrics
2	Volume Resistance of Various Shaped Insulation Portion
3	Electrical Conduction of Metals
4	Superconductivity and Hyperconductivity
5	Midterm Exam 1
6	Band Theory of Solids
7	Dependence of Resistivity of Dielectrics on Various Factors
8	Ionic and Molionic Electrical Conduction of Dielectrics
9	Polarization of Dielectrics
10	Midterm Exam 2
11	Capacitance and Resistance of Insulations
12	Polar and Nonpolar Dielectrics
13	Physical Essence of Polarization of Dielectrics
14	Dependence of Permittivity on Various Factors
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.				x	
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.				x	
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.					x
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.					x
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			x		
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.					x
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.				x	



ESOGU Physics Department Course Information Form

COURSE CODE: 121317575

COURSE NAME: MOLECULAR SPECTROSCOPY

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	0	6	3	8	COMPULSORY () ELECTIVE (X)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (✓) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	2	10	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project	1	50	Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	30		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Performed experimental studies to determine the characteristics of a compound to be selected report are prepared.				
OBJECTIVES OF THE COURSE		The device according to investigations made in this compound is a compound will be selected and the students thoroughly determined to have information about the instrument, in comparison with the literature results of experimental studies to evaluate the ability of making the acquisition and the acquisition of the findings.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Increasing the ability to use the device, the method used to analyze the compound / learning methods, whether a certain topic in the literature survey, the results reached by the experimental work, written and oral presentation should be upgraded to discuss.				
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Understands the importance of the study area. 2. Examines the literature regarding the study area, collects, describes and discusses them. 3. Uses the previous information for the workspace, applies. 4. Study on the experimental designs, makes experiments, collects data. 5. Combines the results of studies, reviews, evaluates, discusses and offers the ultimate in writing to edit. 6. Orally presents and defends the run. 7. Poster-making work, exhibitions, and defends. 				
MAIN TEXTBOOK		Stuart, B. H., "Infrared Spectroscopy: Fundamentals and Applications" Chichester, J. Wiley, 2004.				
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Garton, A., "Infrared Spectroscopy of Polymer Blends, Composites and Surfaces", Oxford University Press, 1992. 2. Covering the ownership of the work of the methods used in the study of solids magazines. 				
NECESSARY COURSE MATERIALS		Fume Hood, magnetic stirrer, precision scales, and chemical materials.				

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Review of the literature
2	Review of the literature
3	Review of the literature
4	Review of the literature
5	Midterm Exam 1
6	Experimental Studies
7	Experimental Studies
8	Experimental Studies
9	Experimental Studies
10	Midterm Exam 2
11	analysis
12	analysis
13	Discussion of the study and writing of the report
14	Discussion of the study and writing of the report
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		X			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.			X		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.			X		



ESOGU Physics Department Course Information Form

COURSE CODE: 121317576 COURSE NAME: INTRODUCTION OF QUANTUM ELECTRONICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week) of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (✓) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	20	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		the main aim of the course is Learning of Quantum Electronics concepts, Quantum Electronics, Amnon Yariv, John Viley, New York, 1989., Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application, Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems					
OBJECTIVES OF THE COURSE		The main aim of the course is Learning of Quantum Electronics concepts, Quantum Electronics, Amnon Yariv, John Viley, New York, 1989., Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application, Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems					
LEARNING OUTCOMES OF THE COURSE							
MAIN TEXTBOOK							
SUPPORTING REFERENCES		<ol style="list-style-type: none"> 1. Quantum Electronics, Amnon Yariv, John Viley, New York, 1989. 2. Principles of Lasers, Orazio Svelto, Plenum Press, 1989 3. Laser Electronics, Joseph T. Verdeyen, Prentice Hill, 1989. 4. Atom, Molekül ve Laser Fiziği, Taşal Erol, Ders Notu, Yayınlanmadı. 					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE

WEEK	SUBJECTS
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1	Introduction to lasers
2	Review of concepts of classical mechanic
3	Review of concepts of modern physic
4	The postulates of quantum mechanics, operator
5	Midterm Exam 1
6	Eigenfunctions and eigenvalue
7	Preparatory concepts function spaces and hermitian operators The superposition principl
8	Commutator theorem
9	Time development, concervation theorem Parity
10	Midterm Exam 2
11	One-dimensional schrödinger equation One-dimensional barrier problems
12	WKB approximation and bohr-summerfield quantization
13	Presented of applications
14	Molecular Application of Gaussan 03 and CAChe programmes Molecular Application of Gaussan 03 and CAChe programmes
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		x			
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317577

COURSE NAME: FIBER OPTICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM	Activity type		Number	%	Activity type	Number	%
	Midterm Exam				Midterm Exam		
	Quiz				Experimenting Performance		
	Homework		2	25	Reporting		
	Project				Oral Exam or Quiz		
Other (.....)				Other (.....)			
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Optical Fiber Communications Systems; Optical Fibers; Nature of Light; Fundamental Optics Laws and Definitions; Optical Fibers Modes and Configurations; Fiber Types; Rays and Modes; Rays Optics; Wave Optics.					
OBJECTIVES OF THE COURSE		To teach basic concepts and knowledge associated with fiber optics and to apply the fundamental mathematical relations that used the optical communications.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To analyze natural phenomena by explain, working with different occupational groups since this subject interdisciplinary field.					
LEARNING OUTCOMES OF THE COURSE		Ability to apply information that concerned with the technology.					
MAIN TEXTBOOK		Özsoy S., (1998), Fiber Optik, Birsen Yayınevi.					
SUPPORTING REFERENCES		1) Powers J., (1997), An Introduction to Fiber Optic Systems, Irwin. 2) Tomasi W, (2002), Çeviren Mustafa Atakay, Elektronik İletişim Teknikleri, MEB Yayınları. 3) Varol H. S., Yağımlı M., (2008) Optoelektronik ve Fiber Optik, Beta Yayınevi.					
NECESSARY COURSE MATERIALS		Face to face					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Overview of Optical Fiber Communications
2	Evolution of Fiber Optic Systems
3	Elements of Optical Fiber Transmission Link
4	Optical Fibers
5	Midterm Exam 1
6	Nature of Light, Linear, Elliptical and Circular Polarization
7	Fundamental Optics Laws and Definitions
8	Fiber Optics Modes and Configurations
9	Fiber Types, Rays and Modes
10	Midterm Exam 2
11	Step index fiber structure
12	Ray Optics Representation
13	Boylamsal ve Sarmal Işımlar
14	Wave Optics
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	x				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	x				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	x				
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317578

COURSE NAME: PRINCIPLES OF MAGNETIC RESONANCE

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (✓) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES		LABORATORY COURSES			
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam			Midterm Exam		
		Quiz			Experimenting Performance		
		Homework	2	20	Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	60			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Principles of resonance, Magnetic dipole broadening in rigid lattices, Magnetic interaction of electrons with nuclei					
OBJECTIVES OF THE COURSE		Principles of Resonance (Part I)					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING							
LEARNING OUTCOMES OF THE COURSE							
MAIN TEXTBOOK		Principles of Magnetic Resonance, Charles P. Slichter; 1984					
SUPPORTING REFERENCES		Physics of Atoms and Molecules, B.H. Bransden, C.J. Joachain, 1999, Introduction to Solid State Physics, C. Kittel, 1996					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Principles of resonance
2	Principles of resonance
3	Basic theory
4	Basic theory
5	Midterm Exam 1
6	Application with the examples of solid state physics
7	Magnetic dipole broadening in rigid lattices
8	Magnetic dipole broadening in rigid lattices
9	Magnetic dipole broadening in rigid lattices
10	Midterm Exam 2
11	Application with the examples of solid state physics
12	Magnetic interaction of electrons with nuclei
13	Magnetic interaction of electrons with nuclei
14	Application with the examples of solid state physics
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		x			
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317579

COURSE NAME: ELECTRONIC PROPERTIES OF MATERIALS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	0	6	3	8	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type		Number	%	Activity type	
	Midterm Exam				Midterm Exam	
	Quiz				Experimenting Performance	
	Homework		2	20	Reporting	
	Project				Oral Exam or Quiz	
Other (.....)				Other (.....)		
FINAL EXAM			1	60		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Theory of reaction velocity, phase converters kinetic, diffusion, I Fick's law, II. Fick's law, Liquid-solid converters, electronic properties, electron models.				
OBJECTIVES OF THE COURSE		Electrical properties of materials				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING						
LEARNING OUTCOMES OF THE COURSE						
MAIN TEXTBOOK		Electronic properties of materials, Adnan TEKİN, 1986				
SUPPORTING REFERENCES		Solidstate books				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Theory of reaction velocity
2	Phase converters kinetic
3	Diffussion
4	Diffussion types at solids
5	Midterm Exam 1
6	Surface diffussion
7	I. Fick law, II. Fick law
8	Diffusion couple , Chemical diffusion
9	Liquid-solid converters
10	Midterm Exam 2
11	Electron models
12	Conductors and insulators
13	Thermal energy and specific heat
14	The electronic structure of the solids
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.		x			
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		x			
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.		x			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317580

COURSE NAME: NANOTECHNOLOGY

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam			Midterm Exam		
		Quiz			Experimenting Performance		
		Homework	1	30	Reporting		
		Project	1	30	Oral Exam or Quiz		
FINAL EXAM			1	40	Other (.....)		
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		What are nanotechnology and nanoscience? Nanostructures. Fabrication methods of nanostructures. Studies on different areas.					
OBJECTIVES OF THE COURSE		Günümüzde üretim ve karakterizasyonun nano ölçekte gerçekleştirme yöntemlerini tanıtmaktır. To introduce methods of the fabrication and the characterization in nanoscale.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Students will learn natural phenomena in nanoscale.					
LEARNING OUTCOMES OF THE COURSE		24. Apply knowledge of natural sciences (Mathematics, Physics, Chemistry). 25. Justify and analyze natural phenomena. 26. Identify, formulate, and solve field related problems. 27. Interdisciplinary knowledge association and application. 28. Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems. 29. Direct correlation and application of gained knowledge with technology and industry. 30. Function as a team member. 31. Get an understanding of professional and ethical responsibility. 32. Get a recognition of the need for, and an ability to engage in life-long learning. 33. Gain a knowledge of contemporary issues.					
MAIN TEXTBOOK		Edward L. Wolf, "Nanophysics and Nanotechnology", Wiley-VCH Verlag GmbH&Co. KGaA, Weinheim, 2006					
SUPPORTING REFERENCES		1. D.R. Vij, "Handbook of Applied Solid state Spectroscopy", Springer, New York, 2006 2. Georgi Staikov, "Electrocrystallization in nanotechnology", Wiley-VCH Verlag GmbH&Co. KGaA, Weinheim, 2007					

COURSE SCHEDULE

WEEK	SUBJECTS
1	Nanometers, Micrometers, Millimeters. Moore's Law Nanometre, Mikrometre, Milimetre, Moore Yasası,

	Esaki's Quantum Tunneling Diode.
2	Mechanical Frequencies in Small Systems
3	Vibrations of a linear atomic chain.
4	Particle (Quantum) Nature of Matter: Photons, Electrons, Atoms, Molecules
5	Midterm Exam 1
6	Examples of Nanomotors and Nanodevices
7	Quantum Nature of the Nanoworld
8	Quantum Nature of the Nanoworld
9	spintronics
10	Midterm Exam 2
11	Fermi Energy, Density of states
12	Density of states , Dimensionality
13	Self-assembled Nanostructures in Nature and Industry
14	Self-assembled Nanostructures in Nature and Industry
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.				x	
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317581

COURSE NAME: ACOUSTICS IN LIQUIDS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (✓) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	20	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework	1	20	Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	40			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		ultrasonic detectors and measurement techniques, relaxation theory for liquids, thermal relaxation, viscoelastic media, absorption coefficient effect of temperature and pressure, structural relaxation, theories of sound velocity, sound velocity effect of temperature and pressure, nonlinear acoustics.					
OBJECTIVES OF THE COURSE		By the end of this module students will be able to: <ol style="list-style-type: none"> 1. Learn ultrasound its chemical and physical effects. 2. Learn fundamental acoustics phenomena. 3. Learn ultrasonic measurement techniques. 					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Analyze and resolve acoustics phenomenon					
LEARNING OUTCOMES OF THE COURSE							
MAIN TEXTBOOK		KINSLER L. E. (1982). Fundamentals of Acoustics New York :Johan Wily & Sons Pierce A.D. (1991). Acoustics, New York: Acoustical Society of America.					
SUPPORTING REFERENCES							
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Sound and ultrasonic detectors
2	Sound and ultrasonic measurement techniques
3	Relaxation theory for liquids
4	Thermal relaxation
5	Midterm Exam 1
6	Viscoelastic media
7	absorption coefficient effect of temperature
8	absorption coefficient effect of pressure
9	theories of sound velocity
10	Midterm Exam 2
11	Sonund velocity in liquids and gases
12	Sound velocity effect of temperature
13	Sound velocity effect of pressure
14	nonlinear acoustics
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			x		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.		x			
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	x				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.			x		
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			x		
9	Ethical and professional responsibility.			x		
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317582

COURSE NAME: PHOTOVOLTAIC SOLAR CELLS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM	Activity type		Number	%	Activity type	Number	%
	Midterm Exam		2	25	Midterm Exam		
	Quiz				Experimenting Performance		
	Homework				Reporting		
	Project				Oral Exam or Quiz		
Other (.....)				Other (.....)			
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Semiconductors, pn junctions, the structure of solar cells, the photo current in solar cells, electrical properties of solar cells, the efficiency of solar cells, the thickness of solar cells, the varieties of solar cells, solar cell technology, the application areas of solar cells, the main parameter in producing of solar cells, the materials for solar cells.					
OBJECTIVES OF THE COURSE		To teach basics of solar cell technology and acquire the ability to application in practice.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To teach the importance of solar cells in technological applications.					
LEARNING OUTCOMES OF THE COURSE		13. Knows the basic concepts and structure of solar cells. 14. Knows the basic characteristics of solar cells. 15. Knows the types and application areas of solar cells. 16. Knows the production of solar cells and appropriate materials					
MAIN TEXTBOOK		Harold J. Hovel, Semiconductors and semimetals, vol. 11 Solar Cells					
SUPPORTING REFERENCES		2. John P. McKelvey, Solid State and Semiconductor Physics. 3. Physics of Solar Cells: From Basic Principles to Advanced Concepts, Peter Würfel, 2009. 4. Thin Film Solar Cells: Fabrication, Characterization and Applications, Jef Poortmans, 2006 5. Prof.Dr. Kaşif ONARAN, Malzeme Bilimi.					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Semiconductors
2	pn junctions, forward and reverse bias
3	The structure of solar cells, the photo current in solar cells
4	Electrical properties of solar cells
5	Midterm Exam 1
6	The efficiency of solar cells, the thickness of solar cells
7	The varieties of solar cells
8	Solar cell technology
9	The application areas of solar cells
10	Midterm Exam 2
11	The main parameter in producing of solar cells
12	Production techniques for solar cells
13	The materials for solar cells
14	Characterization of solar cells
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			x		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			x		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			x		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.		x			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317583

COURSE NAME: CLASSICAL AND QUANTUM HARMONIC OSCILLATORS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	0	6	3	8	COMPULSORY () ELECTIVE (X)	
Mathematics and Basic Sciences		Physics Subjects [Please depict (✓) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam	1	30	Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project	1	30	Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	40		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Introduction to harmonic oscillator problem and classical perspective, free harmonic oscillator system and its examples, the effect of friction, the damped and forced oscillators, the superposition law, the coupled oscillator systems, the generalized coordinates, the configuration space, the Lagrange Formalism, application to multidimensional harmonic oscillators by the Lagrange formalism, the Noether theorem, problems and applications of the Noether theorem, the Hamilton Formalism, the Hamilton equations of motion, application to multidimensional harmonic oscillators by the Hamilton formalism, the role of harmonic oscillator in various application areas and its discussion.				
OBJECTIVES OF THE COURSE		To introduce applications of the harmonic oscillator problem in a daily life, and to calculate some of its physical properties such as energy, momentum, and realize classical solution methods of the problem.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		Students will learn how to use the concepts of classical physics in investigation of natural phenomena. Meanwhile, students will be able to solve these phenomena fundamentally by recognizing them as classical oscillators.				
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry). Justify and analyze natural phenomena. Identify, formulate, and solve field related problems. Interdisciplinary knowledge association and application. Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems. Direct correlation and application of gained knowledge with technology and industry. Function as a team member. Get an understanding of professional and ethical responsibility. Get a recognition of the need for, and an ability to engage in life-long learning. Gain a knowledge of contemporary issues				
MAIN TEXTBOOK		Bloch, S. C., "Introduction to classical and quantum harmonic oscillators", John Wiley & Sons Ltd., New York, 1997.				
SUPPORTING REFERENCES		1. Kittel, C. Knight, W. D. Ruderman, M.A. Helmholtz, A. Mayer, B.J. Çeviri: Elerman, Y. & Durlu, T.N., "Mekanik (Berkeley Fizik Serisi, cilt 1)", Bilim Yayınları, Ankara., 1965. 2. Özemre, A.Y., "Klasik Teorik Mekanik", İstanbul Üniversitesi Fen Fakültesi Yayınları, İstanbul, 1981.				
NECESSARY COURSE MATERIALS						

COURSE SCHEDULE

WEEK	SUBJECTS
1	Introduction to harmonic oscillator problem and classical perspective
2	Free harmonic oscillator system and its examples
3	The configuration space
4	The superposition law
5	Midterm Exam 1
6	The coupled oscillator systems
7	The generalized coordinates
8	The Lagrange formalism
9	Application of the Lagrange formalism to multidimensional harmonic oscillators
10	Midterm Exam 2
11	The Noether theorem, its applications and related problems
12	The Hamilton formalism, the Hamilton equations of motion
13	Applications of the Hamilton formalism to the systems with multidimensional harmonic oscillators
14	The role of harmonic oscillator in various application areas and its discussion.
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES

(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.				x	
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.		x			
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.		x			
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.	x				
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			x		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.		x			
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317584

COURSE NAME: RADIATION AND RADIATION

SAFETY METHODS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week) of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	-	-	Midterm Exam	-	-
		Quiz	-	-	Experimenting Performance	-	-
		Homework	1	70	Reporting	-	-
		Project	-	-	Oral Exam or Quiz	-	-
		Other (.....)	-	-	Other (.....)	-	-
FINAL EXAM			1	30		-	-
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		Electromagnetic Theory I & II, Quantum Physics I & II					
SHORT COURSE CONTENT		Atomic structure Radiation Radioactivity and radioactive decay law Ionizing radiation and types of ionizing radiation Measuring radiation					
OBJECTIVES OF THE COURSE		Provide basic knowledge of radiation Understand possible hazards associated with radiation					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		We aimed at introducing students to professions which are directly related to the nuclear physics by giving details of application areas of nuclear physics and organizing seminars in this area.					
LEARNING OUTCOMES OF THE COURSE		With a good understanding of radiation, recognize safety responsibilities for natural and manmade radiation sources					
MAIN TEXTBOOK		"Radiological Worker I and II Training" Los Alamos National Laboratory, 1998.					
SUPPORTING REFERENCES		"Nuclear Physics I and II" K. S. Krane, 1988, John Wiley & Sons, Inc.					
NECESSARY COURSE MATERIALS		Nuclear Physics Research Lab.					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Atomic structure
2	Radiation, radioactivity
3	Radioactive decay law
4	Natural radioactivity, radioactive half-life
5	Midterm Exam
6	Radioactive material, radioactive contamination
7	Ion, ionization
8	Ionizing radiation, types of ionizing radiation
9	Alpha particles
10	Midterm Exam
11	Beta particles
12	Gamma- and X-rays
13	Neutrons
14	Units of measuring radiation, measuring nuclear radiation
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modeling and solving of physics problems by the theoretical and experiential information about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modeling method for the complex physics problems about physics and related areas.	X				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.			X		
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.			X		
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.	X				
10	Knowledge about project management, risk management and change management and awareness about sustainable development, innovativeness, entrepreneurship.		X			
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that is local and global.	X				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317585

COURSE NAME: QUANTUM INFORMATION THEORY

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		The basic concepts of quantum physics;Introduction to quantum information theory;Quantum algorithms;Quantum logic circuits;Applications					
OBJECTIVES OF THE COURSE		To teach students the basics of quantum information theory.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To equip the students about the concepts of future computer of quantum Era.					
LEARNING OUTCOMES OF THE COURSE		To teach students to implement their original projects.					
MAIN TEXTBOOK		Lecture notes					
SUPPORTING REFERENCES		Computer labs					
NECESSARY COURSE MATERIALS		Internet based simulations.					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Review of quantum concepts
2	Heisenberg uncertainty principles and its applications
3	Introduction to quantum computation
4	Quantum algorithms
5	Midterm Exam 1
6	Introduction of student's project
7	How a Project is realised?
8	Midterm Exam
9	Submit of student's project
10	Midterm Exam 2
11	Project outline by student
12	Project management methods
13	Final revision of the project
14	Project evaluation
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	x				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	x				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	x				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	x				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		x			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.		x			
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	x				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	x				
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317586

COURSE NAME: MEDICAL IMAGING TECHNIQUES

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (X)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam			Midterm Exam		
		Quiz			Experimenting Performance		
		Homework	1	30	Reporting		
		Project	1	40	Oral Exam or Quiz		
		Other (.....)			Other (.....)		
FINAL EXAM			1	30			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Types of medical imaging methods, physical fundamentals and applications of X-ray imaging, ultrasound imaging and radioactive imaging					
OBJECTIVES OF THE COURSE		Exploration of physical fundamentals of medical imaging diagnosis techniques					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To provide the students ability to apply and associate their theoretical knowledge with medical imaging field					
LEARNING OUTCOMES OF THE COURSE		Obtaining fundamental knowledge on medical imaging and to use this knowledge for given applications					
MAIN TEXTBOOK		Cho, Z. H., Jones J. P., Singh M. (1993). Foundations of Medical Imaging. New York: John Wiley					
SUPPORTING REFERENCES		Reported publications on medical imaging field					
NECESSARY COURSE MATERIALS							

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Introduction to medical imaging methods and historical remarks
2	Fundamental principles of medical imaging methods and their comparative investigations
3	Fundamentals of imaging by using ionizing radiation
4	Physical fundamentals and applications of X-ray imaging
5	Midterm exam
6	Physical fundamentals of computerized tomography method
7	Applications of computerized tomography method
8	Physical fundamentals of ultrasound method
9	Applications of ultrasound method
10	Midterm exam
11	General information on radioactive imaging methods
12	Physical fundamentals and application of positron emission tomography (PET)
13	Physical fundamentals and application of single positron emission tomography (SPECT)
14	Dedectors in radioactive imaging
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.	X				
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.	X				
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.		X			
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.	X				
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	X				
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	X				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.	X				
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317588

COURSE NAME: THIN FILM APPLICATIONS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE			
	Theory	Tutorial	Credit	ECTS	TYPE	
7	0	6	3	8	COMPULSORY () ELECTIVE (x)	
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).						
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
3		()				
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES	
MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam			Midterm Exam		
	Quiz			Experimenting Performance		
	Homework	2	25	Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		
FINAL EXAM			1	50		
MAKE UP EXAM (Oral/Written)		Written				
PREREQUISIT(S) IF ANY		-				
SHORT COURSE CONTENT		Introduction to Material Science, vacuum science and technology, Thin film growth mechanisms, physical vapour deposition, chemical vapour deposition, spray pyrolysis technique				
OBJECTIVES OF THE COURSE		To coach equipped students for thin film technology, semiconductor films, clean energy sources, solar cells.				
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To learn and apply thin film coating Technologies, to realize the semiconductor technology and its importance, to gain experience on clean energy sources and solar cells.				
LEARNING OUTCOMES OF THE COURSE		<ol style="list-style-type: none"> 1. Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) 2. Identify, formulate, and solve field related problems 3. Design and conduct experiments as well as to analyze and interpret data 4. Interdisciplinary knowledge association and application 5. Direct correlation and application of gained knowledge with technology and industry 6. Get a recognition of the need for, and an ability to engage in life-long learning 7. Gain a knowledge of contemporary issues 				
MAIN TEXTBOOK		The Materials Science of Thin Films, Milton Ohring				
SUPPORTING REFERENCES		Handbook of Thin-Film Deposition Processes and Techniques - Principles, Methods, Equipment and Applications, Seshan, K				
NECESSARY COURSE MATERIALS		Available devices in thin film production Research Laboratory and Semiconductor Characterization Research Laboratory, consumables for materials to be studied.				
COURSE SCHEDULE						
WEEK	SUBJECTS					

1	Introduction to Material Science
2	Introduction to Material Science
3	vacuum science and technology
4	Thin film growth mechanisms
5	Midterm Exam 1
6	Thin film growth mechanisms
7	Physical vapour deposition
8	Physical vapour deposition
9	chemical vapour deposition
10	Midterm Exam 2
11	chemical vapour deposition
12	spray pyrolysis technique
13	spray pyrolysis technique (Laboratory application and film production)
14	spray pyrolysis technique (Laboratory application and film production)
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.			X		
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121317587

COURSE NAME: Atmospheric Pressure Plasmas

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	2	2	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM			1	50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Describing of fourth state of matter, Plasma production, Plasma types, Plasma temperature, Plasma density, plasma ionization degree, Debye length, Debye sheath, Plasma frequency, Quasi-Neutrality, Internal Plasma Reactions, Plasma and electromagnetic wave, Plasma and solid surface interactions					
OBJECTIVES OF THE COURSE		to explore and understand the Atmospheric Pressure Plasmas investigating their plasma parameters, and is to study internal plasma reactions and interactions plasma-solid surface					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)					
MAIN TEXTBOOK		Ekem, N. Musa G. ve Akan T. (2001). Plazma Fiziği Ders Notları, Eskişehir.					
SUPPORTING REFERENCES		1. Grill, A. (1993). Cold Plasma in Materials Fabrication, IEEE pres, New York. 2. Roth, J. R. (1995). Industrial plasma engineering, vol. I, IOP publishing, Bristol and Philadelphia. 3. Raizer, Y. P. (1991). Gas discharge physics, Springer-Verlag, USSR. 4. Nasser, E. (1971). Fundamentals of gaseous ionization and plasma electronics, Wiley.					
NECESSARY COURSE MATERIALS		Face to face					

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Describing of fourth state of matter
2	Plasma production and plasma types
3	Plasma temperature, plasma density, plasma ionization degree
4	Debye length, Debye sheath, Plasma frequency
5	Midterm Exam 1
6	Quasi-Neutrality
7	Total Thermodynamic Equilibrium, Local and Non-Local Thermodynamic Equilibrium
8	Describing Atmospheric Pressure Plasmas
9	Internal Plasma Reactions
10	Midterm Exam 2
11	Plasma and electromagnetic wave
12	Secondary Electron Emission
13	Sputtering
14	Dielectric Barrier
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.		x			
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			x		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	x				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	x				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	x				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	x				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		x			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.	x				
9	Ethical and professional responsibility.		x			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.	x				
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			x		
12	To have knowledge about the modern problems that are local and global.	x				



ESOGU Physics Department Course Information Form

COURSE CODE: 121317589

COURSE NAME: PHYSICS TOPICS ADAPTABLE TO TECHNOLOGY

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	TYPE		
7	0	6	3	8	COMPULSORY () ELECTIVE (x)		
Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).							
Mathematics and Basic Sciences		Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social		
3		()					
MEASURING AND EVALUATION ACTIVITIES		THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES		
MIDTERM		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting Performance		
		Homework			Reporting		
		Project			Oral Exam or Quiz		
FINAL EXAM				50			
MAKE UP EXAM (Oral/Written)		Written					
PREREQUISIT(S) IF ANY		-					
SHORT COURSE CONTENT		Vacuum and vacuum systems, DC glow discharge, Plasma source, Surface modification, Application of the Industrial Physics.					
OBJECTIVES OF THE COURSE		Fundamentals of plasma production systems and vacuum systems.					
CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING		To design of vacuum systems and plasma manufacturing systems					
LEARNING OUTCOMES OF THE COURSE		Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues					
MAIN TEXTBOOK							
SUPPORTING REFERENCES		Roth,A. (1995) , Vacuum Technology, Amsterdam: Elsevier Publishing Company. Lieberman,M. , Lichtenberg,A.L., Principles of Plasma Discharges And Materials Processing, New York: Wiley-Interscience Publication McDaniekl, E.W. (1964) , Collision Phenomena in Ionized Gases,					

	WileySons,Inc. Grill,A. (1993) , Cold Plasma in Materials Fabrcation, IEEE Press Marr,G.V. (1968) , Plasma Spectroscopy, Elsevier Publishing Company Griem,H.R. , Plasma Spectroscopy, McGraw-Hill Company
NECESSARY COURSE MATERIALS	

COURSE SCHEDULE	
WEEK	SUBJECTS
1	Vacuum and vacuum systems (Lab. applications)
2	Vacuum and vacuum systems (Lab. applications)
3	DC glow discharge and lab. applications
4	DC glow discharge and lab. applications
5	Midterm exam 1
6	Plasma source
7	Plasma source
8	Surface treatment and lab. applications
9	Surface treatment and lab. applications
10	Midterm exam 2
11	Surface treatment and lab. applications
12	Surface treatment and lab. applications
13	Surface treatment and lab. applications
14	Industrial applications of physics
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.			X		
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.			X		
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.	X				
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.	X				
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.	X				
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.	X				
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.		X			
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew			X		

	oneself continuously.					
9	Ethical and professional responsibility.		X			
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.			X		
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.			X		
12	To have knowledge about the modern problems that are local and global.		X			



ESOGU Physics Department Course Information Form

COURSE CODE: 121318XXX

COURSE NAME: INTERSHIP

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE		
	Theory	Tutorial	Credit	ECTS	TYPE
8	0	0	0	30	COMPULSORY () ELECTIVE (x)

Please depict the credit (for non-credit courses, number of course hours per week)of the course below (please share the credits if necessary).

Mathematics and Basic Sciences	Physics Subjects [Please depict (√) if the course include design significantly]	General Education	Social
3	()		

MEASURING AND EVALUATION ACTIVITIES	THEORETICAL AND TUTORIAL COURSES	LABORATORY COURSES
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MIDTERM	Activity type	Number	%	Activity type	Number	%
	Midterm Exam			Midterm Exam		
	Quiz			Experimenting Performance		
	Homework			Reporting		
	Project			Oral Exam or Quiz		
	Other (.....)			Other (.....)		

FINAL EXAM						
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MAKE UP EXAM (Oral/Written)						
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PREREQUISIT(S) IF ANY						
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SHORT COURSE CONTENT						
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OBJECTIVES OF THE COURSE						
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CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING						
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LEARNING OUTCOMES OF THE COURSE						
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MAIN TEXTBOOK						
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SUPPORTING REFERENCES						
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NECESSARY COURSE MATERIALS						
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COURSE SCHEDULE

WEEK	SUBJECTS
1	
2	
3	
4	
5	
6	

7	
8	
9	
10	
11	
12	
13	
14	
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES						
(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)						
NO	PROGRAM OUTCOME	5	4	3	2	1
1	Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas.					
2	Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems about physics and related areas.					
3	Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a specified objective.					
4	Skill of the effective usage of information technology, selection, development and usage of the modern techniques and tools which are necessary for the application of physics.					
5	An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the chemical engineering.					
6	An ability of having disciplinary and interdisciplinary teamwork and ability of individual working.					
7	Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of foreign language.					
8	An awareness of the necessity of life-long learning; accessing to the information, following the scientific and technological developments and ability of renew oneself continuously.					
9	Ethical and professional responsibility.					
10	Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, entrepreneurship.					
11	The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results of physical solutions and national and international legal regulation and the standards.					
12	To have knowledge about the modern problems that are local and global.					