Courses and ECTS Credits

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

2 nd Year					
Code	Course Name	AKTS	D+U+L	Z/S	Language
Autumm To	erm				
	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 Te	rm Summation:				
Spring Teri	<u>n</u>				
	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 Terr	n Summation:				
2 nd year tot	ally:				

3 th Year					
Code	Course Name	AKTS	D+U+L	Z/S	Language
<u>Autumm T</u>	<u>erm</u>				
	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 Te	rm Summation:				
<u>Spring Teri</u>	<u>m</u>				
	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 Teri	m Summation:				
3 th year tot	ally:				

4 th Year					
Code	Course Name	AKTS	D+U+L	Z/S	Language
<u>Autumm T</u>	erm				
	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 Te	rm Summation:				
Spring Ter	<u>m</u>		-		
	Internship	30	0+0+0	Z	Turkish
Spring Ter	m Summation:				
4 th year tot	ally:				

COURSE	COURSE	FIRST AID I
CODE	NAME	

SEMESTER	WE	EKLY COUF	RSE PERIO	OD			COURSE OF	
	Theory	Practice	Labra	tory	Credit	ECTS	ТҮРЕ	LANGUAGE
1	1	0	0		0	1	COMPULSORY () ELECTIVE (X)	TURKISH
				COUR	SE CATA	AGORY		
Basic Scier	nce	Basic Engin	eering	[if i			ngineering Profession erable design, mark with (√)]	Social Science
								Х
			A		MENT C			0/
				st Mid-	aluation 7 Term	ype	Quantity	% _
				2nd Mid			- 1	<mark>40</mark>
				Quiz	-10111		1	-
	MID-TI	ERM		Homewo				
				Project				
				•			-	_
				Report)		-	_
	FINAL F		(Others (.)		- 1	60
	FINAL E		7	TOTAL			2	100
	REREQUI							100
COU	RSE DES	SCRIPTION	c i	or injure njured p This cou	ed person person. urse aim	until mo	irst aid knowledge and skills whi edical help to save lives, mainta each first-aid knowledge and s	in safety of the kills to healthy
		JECTIVES	r		ry arrest,		perience a sudden health probler , drowning, poisons, burns, fractu	
		L EDUATIO						
CO	URSE OU	JTCOMES		* * * * * * * * * * * * * * * * * * *	Identify b Assessme Perform b Know a fe first aid p Know to p	riefly an ont of the pasic life oreign ol rocedure practises practises practises practises practises practises practises practises practises	rst aid and first aider atomy and physiology of the hum injured and scene of accident support (Cardio-pulmoner resusc oject blocking the airway by remo of first aid in near drowning of first aid in bleeding of first aid in bleeding of first aid in shock of first aid in injuries of first aid in injuries of first aid in insect and animal t of first aid in burns of first aid in heat stroke and fros of first aid in fractures, dislocation of first aid in a foreign object to o	itation) ving the object o bite and stings tbite ons and sprains

	 Know to practises of first aid in other emergencies (Fainting, Hyperglycemia, Hypoglycemia, epilepsy seizures, heart attack fever etc.)
ТЕХТВООК	Erdil F, Bayraktar N, Çelik SŞ (2009) Temel İlk Yardım. Eflatun Yayınevi, Ankara.
OTHER REFERENCES	 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

COURSE CODE	12	21311197			COURS NAME		Physical Education I	
GEMESTED	WI	EEKLY COUF	RSE PERIO	D			COURSE OF	
SEMESTER	Theory		Labrato		Credit	ECTS		LANGUAGE
Spring	1				0	1	COMPULSORY () ELECTIVE (x)	Turkish
			(OUR	SE CATA	GORY		1
Basic Scien	ce	Basic Engin	eering	[if i			ngineering Profession erable design, mark with (√)]	Social Science
				GEGGI	MENT CI	DITEDI	T A	
					aluation T		Quantity	%
İ			1s	t Mid-		JPC	1	40
ĺ			2n	d Mid	-Term			
	MID-T	TERM	Qu					ļ
				omewo	ork			
				oject port				
				hers (.				
	FINAL	EXAM					1	60
PR	EREQU	JIEITE(S)						
COUI	RSE DE	SCRIPTION	lev	el, sp	ort branch	basketł	g, joint and muscle groups conve ball, volleyball, handball field me bur health; health, first aid, match	asures and rules
COU	RSE OF	BJECTIVES	Th Th lev Th Th Th Th Th Ta lea Ph loo	e abili e abili e abili e abili ysical ke res idershi aying a osing,	ity of having ity of runn ity of impro- ity of having education ponsibility ip amicably a and can be	ng know ing all the oving the ng basic and sport and dur and comp e object	vledge concerning the orders of the he organs and systems to conveni ne nerve muscle and joint coordin knowledge, skill, manner and ha	e lecture. ence of theirs ating. bits concerning ty of doing cceptance of
		URSE TO AP						
COL	JRSE O	UTCOMES	ps		gical, self		lth, happy, developed aspect of pl ent individuals who have the sense	
	TEXTI	BOOK	P	nysica	l Educatio	n at Sch	ools (Hikmet Aracı 1999)	
ОТН	ER REI	FERENCES			rinciples in r)2001	Physic	al Education and Sport (Yrd. Doç	. Dr. Faruk
TOOLS	S AND E REQU	CQUIPMENTS IRED	S					

	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.	Χ		
2	The ability of strengthening all the organs and systems according to their's convenient level.	X		
3	Improving physical skills.	Χ		
4	Improving nerve, muscle and joint coordinating.	Χ		
5	Explaining Atatürk's words on sport and sportmen	Χ		
6	Having basic knowledge skill, manner and habit about sport	Χ		
7	Playing basketball and volleyball with playing rules.	Χ		
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.	Χ		
10	Having basic knowledge, skill, manner and habits about sport.	Χ		
11	Having learned handball and football playing rules and applying them.	Χ		
12	Having knowledge about Olympiad.	Χ		
13	Learning how can be helping a sportman who is disabled.	Х		
14	Having basic knowledge, skill, manner and habits, racing amicably and appreciating the winner.	X		
1:Non	e. 2:Partially contribution. 3: Completely contribution.			·

Instructor(s):

COURSE CODE					COURSI NAME	E ,	TR	ADITIONAL TURKISH ORNA	MENTATION I
SEMESTER	WEI	EKLY COUF	RSE PER	lod				COURSE OF	
Fall	Theory	Practice	Labo	ratory	Credit	ЕСТ	S	ТҮРЕ	OF ELECTIVE Turkish ELECTIVE Turkish Social Science X X 40 40 40 60 60 Securical paper folding over method ache. eme Sanatında Geçmeler,
1	1	0	(0	0	1		COMPULSORY (x) ELECTIVE	Turkish
				COLID	SE CATA	COD	N 7	()	
				COUR	SE CATA	GOR	Y		Social
General Liter	ature	Foreign Lan	iguages			Comp	ara	ntive Literature	
									Х
					MENT C		RIA		
					aluation T	Гуре		Quantity	
				1st Mid-	Term			1	40
				2nd Mid	-Term				
	MID-TE	ERM		Quiz					
				Homewo	ork				
				Project					
				Report					
				Others (.)				
	FINAL E	XAM						1	60
PR	EREQUI	EITE(S)		None					
COU	RSE DES	CRIPTION		tought or applicati	n the basis on of thes	of the e techr	e foi niqu	st in ornamenting his enviroment rmation, evolution, composition ues according to fields and mater knots in Turkish ornamental arts'	techniques and ials. In
COU	RSE OBJ	IECTIVES			of this cou tion and p			teach motifs used in Turkish orn chniques.	amental arts
		URSE TO AP L EDUATIO		They kn	ow Turkis	h orna	mei	ntal techniques.	
COU	JRSE OU	TCOMES		Can mak Can mak Can mak Can mak Can tran Can pain	te compos te border c te circular te free con sfer a com t the figur	ition w composition position position re on d	vith sitio r co on on t raw	with the knots (geçme) in millim onionskin by using folding over on omposition to drawing paper ving paper watercolour and gouache.	
	ТЕХТВО	OOK		BUTTA	NRI, Pro	of. Di	r.	Halil, Türk Süsleme Sanatı yınları, Eskişehir, 2003	nda Geçmeler,
ОТН	(ER REF)	ERENCES		Ofset, İs DEMİRİ ÜNVER Geçmele	tanbul, 20 Z, Yıldız, , Prof. Dr. er Hakkınd	07 İslam A. Sü la, Ark	Saı hey titel	ilge Özkeçeci, Türk Sanatında natında Geometrik Süsleme, İsta yl, Doğuda Kitap Süslerinden Bir k, No:11-12, İstanbul, 1946 ayrı bul, 1947.	nbul, 2000 Kısım

		AKAR, Azade-KESKİNER, Cahide, Türk Süsleme Motif, Tercüman Sanat ve Kültür Yayınları:2, İstanb			Dese
т	OOLS AND EQUIPMENTS	Drawing paper, watercolour, gouache	Jul, 197	0.	
1	REQUIRED	Diawing puper, wateroorour, gouache			
		COURSE SYLLABUS			
VEEK	TOPICS				
1	History of Turkish Ornamental A	rts			
2	History of Turkish Ornamental A	rts			
3	The composition techniques in Tu	urkish 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 u	sing folding over method			
7	Composition with onionskin by u	sing folding over method			
8	Midterm				
9	Design border composition				
10	Design circular border composition	Dn			
11	Composition transfer on drawing				
12	Painting figures on drawing paper	г.			
13	Painting with watercolour and go				
14	Painting with watercolour and go				
15,16	Final S				
15,10					
NO I	PROGRAM OUTCOMES		3	2	1
NO H	naving sufficient knowledge in the fields	of social sciences and the Turkish Language and Literature;	3	2	
NO H h 1 tl	naving sufficient knowledge in the fields he ability to apply theoretical and practic	of social sciences and the Turkish Language and Literature; cal knowledge to solve the problems of the Turkish	3	2	1 x
NO H 1 ti 1	naving sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields	cal knowledge to solve the problems of the Turkish	3	2	
NO H h 1 ti I ti	naving sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite		3	2	
NO F 1 th 1 L 2 c n	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate nethods	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these	3	2	x
NO H 1 th 1 th 2 c n 3 c	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite haracterization and selecting appropriate methods reate a text in line with defined objective	cal knowledge to solve the problems of the Turkish prature and detection of complex issues in related fields,	3	2 	x
$\begin{array}{c} \mathbf{NO} \mathbf{H} \\ \mathbf{h} \\ 1 \mathbf{t} \\ \mathbf{L} \\ 2 \mathbf{c} \\ \mathbf{n} \\ 3 \mathbf{c} \\ \mathbf{a} \\ \mathbf{u} \end{array}$	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods preate a text in line with defined objective bout how to resolve	erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply	3	X	x
$\begin{array}{c} \mathbf{NO} \mathbf{H} \\ \mathbf{h} \\ 1 \mathbf{t} \\ 1 \\ \mathbf{L} \\ 2 \mathbf{c} \\ \mathbf{n} \\ 3 \mathbf{c} \\ \mathbf{a} \\ 4 \mathbf{i} \\ \mathbf{L} \end{array}$	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods treate a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively	3		x
$\begin{array}{c c} \mathbf{NO} & \mathbf{H} \\ \mathbf{h} \\ 1 & \mathbf{t} \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 2 \\ 1 \\ 1 \\ 2 \\ 1 \\$	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods reate a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization fro malysing of the text belong to the Turkis	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to	3	X	x
$\begin{array}{c c} \mathbf{NO} & \mathbf{H} \\ \mathbf{h} \\ 1 & \mathbf{h} \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 2 \\ \mathbf{c} \\ \mathbf{n} \\ \mathbf{n} \\ 3 \\ \mathbf{a} \\ 4 \\ 1 \\ 1 \\ 1 \\ 5 \\ \mathbf{s} \end{array}$	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods reate a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from malysing of the text belong to the Turkis olve the problems, accessing to old and	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively	3	X	x
$\begin{array}{c c} \mathbf{NO} & \mathbf{H} \\ \mathbf{h} \\ 1 & \mathbf{tl} \\ \mathbf{L} \\ 2 & \mathbf{c} \\ \mathbf{n} \\ 2 & \mathbf{c} \\ \mathbf{n} \\ 3 & \mathbf{c} \\ \mathbf{a} \\ 4 & \mathbf{l} \\ \mathbf{L} \\ 5 & \mathbf{s} \\ 0 \end{array}$	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from nalysing of the text belong to the Turkis solve the problems, accessing to old and observation.	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to		X	X
$\begin{array}{c c} \mathbf{NO} & \mathbf{H} \\ \mathbf{h} \\ 1 & \mathbf{h} \\ 1 \\ 1 \\ 1 \\ 1 \\ 2 \\ \mathbf{c} \\ \mathbf{n} \\ \mathbf{n} \\ 3 \\ \mathbf{a} \\ 3 \\ \mathbf{a} \\ 4 \\ 1 \\ 1 \\ 1 \\ 1 \\ 5 \\ 5 \\ 0 \\ 6 \\ \mathbf{a} \end{array}$	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods reate a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization fro malysing of the text belong to the Turkis solve the problems, accessing to old and observation.	eal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary	3	X	X
NOH1th1th2cmth3caa4in1th5s0a6a7c	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods create a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization fro inalysing of the text belong to the Turkis solve the problems, accessing to old and observation.	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary ritten and using/improving knowledge of foreign languages		X	x
NO H h h h t l 2 c n a a 4 iii L 5 s o 6 a 7 a a a a a a a a a a a a a	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from malysing of the text belong to the Turkis solve the problems, accessing to old and observation. bility to individual work and teamwork of communicating effectively in oral and wr and ability to obtain artistic gratification. wareness of the need for lifelong learnin	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary ritten and using/improving knowledge of foreign languages ag; access to information, following the developments in	X X	X	X
NO H h h h t l 2 c n a a 4 iii L 5 s o 6 a 7 a a a a a a a a a a a a a	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from inalysing of the text belong to the Turkis solve the problems, accessing to old and observation.	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary ritten and using/improving knowledge of foreign languages ag; access to information, following the developments in	X	X	x
NOI1th1th1th2cnc3caa4th1th5s0a6a7caa8a9th	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from inalysing of the text belong to the Turkis solve the problems, accessing to old and observation. bility to individual work and teamwork of communicating effectively in oral and wr and ability to obtain artistic gratification. wareness of the need for lifelong learnin cience and technology and the ability of he professional and ethical awareness of	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary ritten and using/improving knowledge of foreign languages ag; access to information, following the developments in self-renewal consistently.	X X	X	x
NOH1th1th1th2cnc3c4th1th5s6a7c6a7c8s9th10k	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate nethods reate a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization from malysing of the text belong to the Turkis olve the problems, accessing to old and observation. bility to individual work and teamwork of communicating effectively in oral and wr and ability to obtain artistic gratification. wareness of the need for lifelong learnin science and technology and the ability of the professional and ethical awareness of cnowledge about work-related application.	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary ritten and using/improving knowledge of foreign languages eg; access to information, following the developments in self-renewal consistently. responsibility ns such as project management, risk management and	X X	X	
NOH1th1th1th2cnc3c4th1th5s6a7cas8s9th10k	having sufficient knowledge in the fields he ability to apply theoretical and practic Language and Literature in this fields he science of Turkish Language and Lite characterization and selecting appropriate methods reate a text in line with defined objective bout how to resolve mproving, selecting, using modern technic Literature and the ability of utilization fro malysing of the text belong to the Turkis solve the problems, accessing to old and observation. bility to individual work and teamwork of communicating effectively in oral and wr and ability to obtain artistic gratification. wareness of the need for lifelong learnin cience and technology and the ability of the professional and ethical awareness of mowledge about work-related application change management; awareness about en	cal knowledge to solve the problems of the Turkish erature and detection of complex issues in related fields, e methods of analysis and solving skills by applying these es or finding appropriate way to gain the ability of apply ques and tools for the science of Turkish Language and om information technology effectively h Language and Literature field or data collecting for to new resources for this, analyzing the results and ability to of disciplinary and interdisciplinary ritten and using/improving knowledge of foreign languages ag; access to information, following the developments in self-renewal consistently.	X X	X	

COURSE CO	DE	121	311193			COURSE NAME		GARDEN DESIGNING, TREATING and GREEENHOUSE CULTURE I					
SEMESTER	WEI	EKLY	COURSE	PERIOD		COURS	COURSE OF						
SEMESTER	Theo	ory	Practice	Laborat	ory	Credit	ECTS	ТҮРЕ		LANGUAGE			
1	1	,	0	0	2	1	1	COMPULSORY () ELECTIVE (X)		TURKISH			
COURSE CA	TEGC	ORY											
Basic Science		Ba	sic Enginee	ring		ology it contains	consider	able design, mark with $()$)]	Social Science			
Х					X				-				
ASSESSMEN	T CR	ITER	IA										
						ation Type		Quantity		%			
						id-Term ⁄Iid-Term		1		40			
					Quiz	/IId-Term							
MID-TERM						ework							
					Proje								
					Repo								
					1	rs ()							
FINAL EXAN	Л				Writ	ten exam		1		60			
PREREQUIE	TE(S)			None								
COURSE DE	SCRII	PTIO	N		 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. 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. 								
COURSE OB	JECT	IVES											
ADDITIVE O PROFESSION				Y	Course will contribute . practical garden arrengement and curation; inner and outer arrengements. to make the students self-confident in works of gardening. To teach conciousness of nature to the students.								
PROFESSIONAL EDUATION 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.										
TEXTBOOK					TOKUR, S.,1994. Bitki Yetiştirme Tekniği, T.C. Osmangazi Ünv.Yayınları No:1 Fen Edebiyat Yayınları No:1 ESKİŞEHİR.								
OTHER REFERENCES				 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. TOKUR, S., 2000 T.C. Osmangazi Üniversitesi Fen Edebiyat Fakültesi Bahçe Bakımı ve Seracılık I-II Papers, ESKISEHIR ÜRGENÇ, S., 1992. Ağaç ve Süs Bitkileri, Fidanlık ve Yetiştirme Tekniği, İ.Ü. Basımevi ve Film Merkezi, İSTANBUL. 									

TOOLS AND EQUIPMENTS REQUIRED

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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		Х	
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		Х	
4	Analyzes the interaction of organisms with their environment		Х	
5	Identifies problems from environmental and organisms sources and suggests solutions for these problems			Х
6	Produces alternatives for Bio-based product development and production processes			Х
7	Works in the industries that use biologically-based methods.			Х
8	Gives priority to the health and environmental safety on the processes related to sustainable development			Х
9	Susceptible to the team work	Х		
10	Uses the science and the scientific method as guide and aware of professional ethical issues		Х	
11	Able to communicate effectively.			Х
12	Knows at least one language to follow up the knowledge in the field			Х
13	Use information technologies effectively as part of the life			Х
14	Contributes to projects related to social responsibility by considering national priorities			х
15	Displays a positive attitude to lifelong learning			Х
1:Non	e. 2:Partially contribution. 3: Completely contribution.		•	

Instructor(s):



DEPARTMEN	ΙT					Fall					
COURSE COI	DE				COURSE N	NAME	Calligraph	phy-I			
SEMESTER	WEEK	LY COURSE I	PERIOD		COURS	E OF]		
SEWESTER	Theory	Practice	Laborat	ory	Credit	ECTS	TYPE		LANGUAGE		
1	1	0	0		0	1	COMPUI	LS. () ELECT.	(x) Turkish		
COURSE CAT	[AGOR]	Y									
Basic Science		Basic Engineer	ing						Social Science		
х											
ASSESSMEN	T CRITI	ERIA		<u> </u>							
MID-TERM				1st M 2nd Quiz Hom Proje Repo	nework ect	<u>%</u> 50					
FINAL EXAM	1				l Exam				50		
PREREQUISI	TE(S)			Non			•				
COURSE DES	SCRIPTI	ON		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. Free script studies as calligraphy, conduction to the "line order" in calligraphy, writing studies of short sentences in calligraphy, free text studies in calligraphy.							
COURSE OBJ	ECTIVI	ES		To gain understanding of aesthetic in art.							
COURSE ADI PROFESSION				To provide general education about the art of calligraphy							
COURSE OU	ГСОМЕ	S		To provide an interest in calligraphy							
ТЕХТВООК			 M. Bedreddin Yazır, Medeniyet Aleminde Yazı ve İslam Medeniyetinde Kalem Güzeli (Cilt I, II, III), Ankara (1974) - Necati Yağan, MEB Yayınları, İstanbul (2005) - Hüseyin Kılıçkan, Okullarda Yazı Doğru ve Güzel Yazmak , İstanbul (2004) - Hüseyin Kılıçkan, Alıştırmalı-Testli Yazı Örnekleri, Taç Kitabevi, Ankara - İ. Hakkı Baltacıoğlu, Türklerde Yazı Sanatı, Kültür Bakanlığı, Ankara, 1993 								
OTHER REFE	ERENCE	ËS									

TOOLS AND EQUIPMENTS REQUIRED Per	encil from Reed, Ink from Soot, Appropriate Paper.
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COURSE CODE				(COURSE NAME	TRA	DITIONAL TURKISH ORNA	MENTATION II		
SEMESTER	WEF	KLY COUR	SE PERIC	DD						
	Theory	Practice	Labora	tory	Credit	ECTS	ТҮРЕ	LANGUAGE		
2	1	0	0		0	1	COMPULSORY (x) ELECTIVE ()	Turkish		
				COUR	SE CATA	GORY				
General Literatur		Foreign Lan	guages			Compar	ative Literature	Social Science		
								Х		
			A		MENT C					
				st Mid-	aluation T	уре	Quantity	%		
					-Term			40		
)uiz	-10111					
	MID-TE	RM		Iomewo	ork					
				Project						
				Report						
)					
FINAL EXAM								60		
PR	EREQUI	EITE(S)	Ν	Jone						
COU	COURSE DESCRIPTION			Motifs used by Turkish artist in ornamenting his enviroment and objects are tought 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 tought.						
COU	RSE OBJ	ECTIVES		The aim of this course is to teach motifs used in Turkish ornamental arts composition and painting techniques.						
		RSE TO AP EDUATION		They know Turkish ornamental techniques.						
PROFESSIONAL EDUATION 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.						
	ТЕХТВО	ЮК					R, Cahide, Türk Süsleme Sanat Kültür Yayınları:2, İstanbul, 19			
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	S AND EQ REQUIF	UIPMENTS RED		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: No	ne. 2: Partially contribution. 3: Completely contribution.			

COURSE CODE	1	21312187			COURSE IAME	1	Physical Education II			
SEMESTER	WEE	KLY COURSE	E PERIO	OD COURSE OF						
SEMILSIER	Theor	ry Practice	Labrato	ory	Credit	ECTS	ТҮРЕ	LANGUAGE		
2	1				0	1	COMPULSORY() ELECTIVE(x)	Turkish		
COURSE CA	TAGOI	RY								
Basic Science		Basic Enginee	ring			0	g Profession able design, mark with $(\sqrt{)}$]	Social Science		
ASSESSMEN	T CRIT	ΓERIA								
				Evaluat	ion Type		Quantity	%		
			[1st Mid-			1	40		
			ļ	2nd Mid	l-Term					
MID-TERM			ŀ	Quiz	1_					
			ŀ	Homew	ork					
			ŀ	Project Report						
			ŀ	Others ()			1		
FINAL EXAM				(,		1	60		
PREREQUIE	ITE(S)									
COURSE DES	SUKIP.	HUN		and rules of game, sport benefits to our health; health, first aid, matches in class.						
COURSE OBJECTIVES				The abil level. The abil The abil physical Take res leadersh Playing loosing,	ity of runr ity of imp ity of havi educatior sponsibilit ip amicably and can b	ning all the roving the ing basic and sport y and duty and comp e object t	ledge concerning the orders of the organs and systems to conven e nerve muscle and joint coordin knowledge, skill, manner and hart y, to go with leader and the abili- petition appreciating the winner a o trick and injustice. port, vehicle and facilities and ca	ience of theirs nating. abits concerning ity of doing acceptance of		
ADDITIVE O PROFESSION		IRSE TO APPI DUATION	LY							
COURSE OU	тсом	ES			ogical, self		th, happy, developed aspect of p nt individuals who have the sens			
TEXTBOOK				Physical Education at Schools (Hikmet Aracı 1999)						
OTHER REF	ERENC	CES		Basic principles in Physical Education and Sport (Yrd. Doç. Dr. Faruk Yamaner)2001						
TOOLS AND REQUIRED	EQUIP	PMENTS								

COURS	SE 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 basketb	all.								
5	Atatürk's words on sport, jogging, passing and playing short-time match in basketball play	ving rul	es.							
6	Jogging, stretching movements, giving basic knowledge about basic volleyball techniques, control pass studies.	, finger	pass o							
7	Interval studying, stretching movements headline at volleyball, pass and service firing, retu			volleyt	ba					
8	What's benefit of sport our health? Stretching movements, doing match in volleyball playi									
9	Running athletics (short, middle, long) knowledge about distance, warning studying, short-	-time v	olleyb	all mate	ch					
10	Jogging, stretching movements, giving knowledge about basic handball techniques.									
11	Jogging, movement for strengthening joint and muscles groups, rubbing ball and pass stud									
12	Exercise for stretching and loosening the muscles, football playing rules and passing studie match.	es, shor	t-time	footbal	1					
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	T					
1	Having knowledge course order and sport hall.	Χ								
2	The ability of strengthening all the organs and systems according to their's convenient level.	X								
3	Improving physical skills.	Χ								
	Improving nerve, muscle and joint coordinating.	X								
	Explaining Atatürk's words on sport and sportmen	Χ								
	Having basic knowledge skill, manner and habit about sport	Χ			1					
	Playing basketball and volleyball with playing rules.	Χ			Ţ					
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.	Х								
	Having basic knowledge, skill, manner and habits about sport.	Х			ſ					
	Having learned handball and football playing rules and applying them.	Х			Ţ					
	Having knowledge about Olympiad.	Χ			Ţ					
10		37	1	1	4					

Х

x

 14
 winner.

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

Learning how can be helping a sportman who is disabled.

Having basic knowledge, skill, manner and habits, racing amicably and appreciating the



13

14

DEPARTMI	ENT							SEMESTER	Sprin	ıg		
COURSE CO	DE			C	OURSE N	AME	Calligrap	hy -II	ny -II			
SEMESTER	WI	EEKLY COURS	E PERIOD				С	OURSE OF				
SLIVILSTER	Theor	y Practice	Laborato	ry	Credit	ECTS		ТҮРЕ		LANGUAGE		
2	1	0	0		0	1	COMPU	JLS. () ELECT	. (x)	Turkish		
			C	OURS	SE CATA	GORY						
Basic Scien	Basic Science Basic Engineering									Social Science		
х	Х											
	I		ASS	ESSN	MENT CR	RITERI	4					
					aluation T	уре		Quantity		%		
					l-Term					50		
					d-Term							
1	MID-	TERM		uiz omew								
1				oject								
1				eport								
l					()							
	FINAL	EXAM		Final Exam						50		
PI	REREQ	UISITE(S)	Ν	Non								
COU	RSE DH	ESCRIPTION		Writing studies of short sentences in calligraphy, free text studies in calligraphy.								
COU	J RSE O	BJECTIVES	Т	To gain understanding of aesthetic in art.								
		ΓΙΟΝ ΤΟ APPL AL EDUATION		To provide general education about the art of calligraphy								
CO	URSE C	DUTCOMES	Т	To provide an interest in calligraphy								
ТЕХТВООК			M 2 3 (2 4 A 5	 M. Bedreddin Yazır, Medeniyet Aleminde Yazı ve İslam Medeniyetinde Kalem Güzeli (Cilt I, II, III), Ankara (1974) - Necati Yağan, MEB Yayınları, İstanbul (2005) - Hüseyin Kılıçkan, Okullarda Yazı Doğru ve Güzel Yazmak , İstanbul (2004) - Hüseyin Kılıçkan, Alıştırmalı-Testli Yazı Örnekleri, Taç Kitabevi, Ankara - İ. Hakkı Baltacıoğlu, Türklerde Yazı Sanatı, Kültür Bakanlığı, Ankara, 1993 								
ΟΤΙ	HER RE	FERENCES										
TOOLS AND	EQUIP	PMENTS REQU	IRED Po	Pencil from Reed, Ink from Soot, Appropriate Paper.								



COURSE CODE: 121313316

COURSE NAME: History of Science in Physics I

SEMESTER		COURSE HOURS WEEK		COURSE							
	Theory	Tutorial	Credit	E	CTS	ТҮРЕ					
3	2	0	2		2	COMPULS	ORY() ELECTIVI	E (x)			
Please depict the	e credit (for non-cre		courses, number of course hours per week)of the course below (please s credits if necessary).								
Mathematics and Basic Sciences		Physics Subjects if the course	s [Please dej			eneral lucation	Social				
MEASURING	AND	THEORETICAL		ORIAL	L	ABORATO	RY COURS	Y COURSES			
EVALUATION	ACTIVITIES	Activity type	RSES Number	%	Activ	ity type	Number	%			
		Midterm Exam	2	25		erm Exam	Tumber	70			
		Quiz			Exper	rimenting rmance					
MIDTERM		Homework			Repo	rting					
		Project				Exam or					
		Other (Internship)			Other	·()					
FINAL EXAM		XX7 ***	1	50							
MAKE UP EXA	AM (Oral/Written)	Written									
PREREQUISI	Γ(S) IF ANY	-									
SHORT COUR	SE CONTENT	 Medieval Euro science, in the Isla Renaissance and the natural science Science in the as Euler, Lagrang Watt, L. Galvani, 	 ancient Greeks science, in the Romans science, Medieval Europe and in the Islamic World Science; the medieval view of science, in the Islamic world science, Renaissance and Modern Science; studies in astronomy, developments in the natural sciences, Galileo Galilei, Isaac Newton, theories of light, Science in the age of Enlightenment; in the 18th century natural sciences, Euler, Lagrange, Laplace, d'Alembert, C. A. Coulomb, J. L. Lagrange, J Watt, L. Galvani, The industrial revolution and science; in the 19th century natural sciences, 								
OBJECTIVES	OF THE COURSI	The main objec philosophy of sc time, scientists ha	ience, and c	cultural s	structure	e that period	by evaluati	ng the			
CONTRIBUTI COURSE TO T PROFESSION		Giving students a from yesterday to	sense of wo								
	UTCOMES OF	Philosophical app sciences, Taking in conjun- day, Being motivated	ction with sc	cientists l	earn m	ore about the					
MAIN TEXTB	ООК	Cemal Yıldırım.					apevi				
SUPPORTING	REFERENCES	Yavuz Unat. (19)2.A. O. Gi3.CemalYayınları4.Infeld, I	 Yavuz Unat. (1997). Bilim Tarihi. İstanbul: Doruk Yayınları A. O. Gürel (2001). Doğa Bilimleri Tarihi. Ankara: İmge Kitapevi Cemal Yıldırım. (1996). Bilimin Öncüleri. Ankara: Tübitak Yayınları 								
NECESSARY (MATERIALS	COURSE	-	20000			,,					

	COURSE SCHEDULE								
WEEK	SUBJECTS								
1	Introduction to Ancient Civilizations								
2	İn 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.	Χ						
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.		Χ					

COURSE CODE: 121313317

COURSE NAME: Technical English I

SEMESTER		COURSE HOURS WEEK			COURSE					
	Theory	Tutorial	Credit	Credit ECTS		ECTS TYPE				
3	2	0	2		2	COMPULSORY () ELECTIVE (x				
Please depict the	e credit (for non-cre	dit courses, number of credits if	course hour necessary).	s per we	ek)of th	e course bel	ow (please sh	are the		
Mathematics	and Basic Sciences	Physics Subjects if the course	s [Please dej) General Social Education			l		
MEASURING	2 AND	THEORETICAL	() AND TUT(
EVALUATION			RSES	JNIAL	L	ABORATO	RY COURS	ES		
		Activity type	Number	%	Activ	vity type	Number	%		
		Midterm Exam	2	25		erm Exam				
MIDTERM		Quiz				rimenting rmance				
MIDIEKNI		Homework			Repo					
		Project			Quiz					
		Other ()			Other	:()				
FINAL EXAM			1	50						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	Γ(S) IF ANY	-								
SHORT COUR	RSE CONTENT	To teach students	the concepts	s of techr	nical an	d scientific E	English.			
OBJECTIVES	OF THE COURS	To bring up stude	nts to a suffi	cient lev	el in En	ıglish.				
CONTRIBUTI COURSE TO T PROFESSION		To learn how to the	anslate a wr	itten ma	terial in	to Turkish.				
	UTCOMES OF	Various physical	and technic	al manus	cripts a	nd easy jour	nal articles			
MAIN TEXTB	ООК	Lecture notes.								
SUPPORTING	REFERENCES	Physics Today an	d Scientific A	Americai	1 journa	als.				
NECESSARY MATERIALS	COURSE	AV materials are	required.							

	COURSE SCHEDULE							
WEEK	SUBJECTS							
1	Basics of technical English							
2	Grammar review							
3	The verbal uasages							
4	Analysis of a technical paper							
5	Midterm Exam1							
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.	х						
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					

COURSE CODE: 121313318

COURSE NAME: Geophysics

SEMESTER		COURSE HOURS WEEK			C				
	Theory	Tutorial	Credit	E	CTS		TYPE		
3	2	0	2		2	COMPULS	E (x)		
Please depict th	e credit (for non-cre	dit courses, number of	course hours? necessary).	s per we	ek)of th	e course belo	ow (please sha	are the	
Mathematics	and Basic Sciences	Physics Subject if the course	s [Please dep	F [Please depict (√) General include design Education			Social		
	2		()						
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAL COU	AND TUTC IRSES	ORIAL	L	ABORATO	RY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam	2	25		erm Exam			
MIDTERM		Quiz			Perfo	rimenting rmance			
		Homework Project			Repor				
					Quiz	Exam or			
		Other ()			Other	· ()			
FINAL EXAM		Written	1	50					
MAKE UP EX	AM (Oral/Written) Written							
PREREQUISI	T(S) IF ANY	None							
SHORT COUR	RSE CONTENT	Introduction to g the geophysics in of gravity, jeostaz electric and magn	Turkey, Gra zi, Magnetisn	avimetry n, Coulor	, Gravit	y, Newton's	law, determi	nation	
OBJECTIVES	OF THE COURS	I some the asian as			eophysio	cal			
CONTRIBUTI COURSE TO T PROFESSION									
LEARNING O THE COURSE	UTCOMES OF		Understanding between the application fields of physics and geophysics						
MAIN TEXTB	OOK	Garland, (1979), Howell,(1978), Ir							
SUPPORTING	REFERENCES								
NECESSARY MATERIALS	COURSE								

	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 Exam1								
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								

RF	LATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES OUTCOMES	AND	THE	PRO	GRA	М
	(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			

Esogi

ESOGU Physics Department Course Information Form

COURSE CODE: 121313319

COURSE NAME: METROLOGY

SEMESTER		COURSE HOURS WEEK			COURSE						
	Theory	Tutorial	Credit	E	CTS						
3	2	0	2		2	COMPULS	E (x)				
Please depict th	e credit (for non-cre	dit courses, number of credits if	course hour necessary).	s per we	ek)of th	e course belo	ow (please sh	are the			
Mathematics	and Basic Sciences	Physics Subjects if the course	s [Please dep			General lucation	Social	I			
	2		()								
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAL COU	AND TUTO	ORIAL	L	ABORATO	RY COURS	ES			
		Activity type	Number	%	Activ	ity type	Number	%			
		Midterm Exam	2	20		erm Exam	-	-			
		Quiz	-	-		rimenting rmance	-	-			
MIDTERM		Homework	-	-	Repo	rting	-	-			
			-	-	Oral I Quiz	Exam or	-	-			
		Other (Internship)	-	-	Other	:()	-	-			
FINAL EXAM	[1	60			-	-			
MAKE UP EX	AM (Oral/Written) Written									
PREREQUISI	T(S) IF ANY	-									
SHORT COUF	RSE CONTENT	Concepts, Physica Terminology of M	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 COURS	To provide profe	ssional knov					ry and			
CONTRIBUTI		Students gain in									
COURSE TO 7			create the infrastructure. Those who work the required training provide a								
PROFESSION	AL TRAINING	potential of in are									
LEARNING O THE COURSE	UTCOMES OF		Basic Knowledge of Measurement Science , Calibration Applications of Measurement Science								
MAIN TEXTB	OOK	Metrology and Ph	Metrology and Physics (Prof. Dr. Naci EKEM)								
SUPPORTING	REFERENCES	Measurement Sci	Measurement Science Notes 1 and 2, Metrology Book (UME)								
NECESSARY MATERIALS	COURSE	Possibilities of Faculty Calibratic Special Calibratic	ion Laborate	ory, UN		· · ·	11				

	COURSE SCHEDULE							
WEEK	CEK 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 1							
11	Introduction to Measurement Devices							
12	Introduction to Measurement Standarts							
13	Introduction to Measurement Area							
14	General Assessment							
15,16	Final Exam							

RF	CLATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES	AND	THE	PRO	GRA	M
	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.	Χ				
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.		Χ			



COURSE CODE: 121313320

COURSE NAME: Popular physics

SEMESTER		JRSE HOURS PER JEK			CO	URSE			
	Theory	Tutorial	Credit	Credit ECTS			TYPE		
3	2	0	2		3	COMPULSORY (x) ELECTIVE ()			
Please depict	the credit (for non-cr	edit courses, number o credits i	of course hour f necessary).	s per weel	c)of the c	ourse below	w (please sha	re the	
Mathematics	and Basic Sciences	Physics Subjects the course	s [Please dep	Please depict (√) if General nclude design Education			Social		
	1		()						
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	L	ABORATO	DRY COURS	SES	
		Activity type	Number	%	Activit	y type	Number	%	
		Midterm Exam			Midter	m Exam	2	25	
		Quiz				menting			
MIDTERM					Perform				
MIDIERM		Homework			Report				
		Project			Oral Ex	xam or			
					Quiz				
		Other ()			Other ()	1	50	
FINAL EXAM		W/					1	50	
MAKE UP EX.	AM (Oral/Written)	Written							
PREREQUISI	Γ(S) IF ANY	-							
SHORT COUR	SE CONTENT	Physics related de		nfamental j	physics la	iws			
	OF THE COURSE	Physics related de							
CONTRIBUTI COURSE TO T PROFESSION		Analytical thinkin	ig and compa	rison of th	e their re	search field	ls.		
LEARNING O COURSE	UTCOMES OF THI	 Identify, Design a Interdisc Direct co and indus Get a rec learning 	 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 						
MAIN TEXTB	OOK	Lecture notes							
SUPPORTING	REFERENCES	Halliday, D. & R Temelleri. Ankara Serway, R.A. (19 Fizik. Ankara: Pal	a: Arkadaş Ya 90). Çeviri H	ayınevi. E ditörü: Ç			-	c için	
NECESSARY MATERIALS	COURSE								

	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 enregy							
7	Nano and more							
	Midtern 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							

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.				Χ	
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.		1	X		1

Prepared by:

Signature(s):



COURSE CODE: 121313320

COURSE NAME: Born of Modern Physics

SEMESTER		URSE HOURS PER CEK			CO	URSE				
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ			
3	2	0	2		3	COMPUL	OMPULSORY (x) ELECTIVE			
Please depic	t the credit (for non-cr	edit courses, number o credits i	f course hour f necessary).	rs per weel	k)of the	course below	w (please sha	re the		
Mathematic	s and Basic Sciences	Physics Subjects the course	• /	lease depict (√) if General lude design Education			Social			
	1		()							
MEASURING ACTIVITIES	AND EVALUATIO		L AND TUT URSES	ORIAL	L	ABORATO	BORATORY COURSES			
		Activity type	Number	%	Activi	ty type	Number	%		
			1	50		rm Exam	2	25		
MIDTERM		Quiz			Experi Perfor	imenting mance				
NIID I EKNI		Homework			Repor					
		Project			Quiz	xam or				
		Other ()			Other	()				
FINAL EXAM			1	50			1	50		
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	T(S) IF ANY									
SHORT COUI	RSE CONTENT	Special theory or mechanics, atomi photoelectric effe principle, wave m	c structure of ct, waves an	f matter, q d particles	uantizati , de Bro	ion of light, glie's hypot	blackbody r hesis, the un	adiation,		
OBJECTIVES	OF THE COURSE	The main object physics is to learn	ive of this					modern		
CONTRIBUTI COURSE TO ' PROFESSION		To work to better which is impleme						elopment		
	UTCOMES OF THI	Interpret the most Vocational skills	and explain and explain ning the stru basic concept cnowledge and of contempor	apply known natural ph cture of t ots in detai ad applicat ary issues.	wledge of enomena he subst 1. ion skills	of basic scie 1. ance to ide s relate.	ntify, formul	1 2		
MAIN TEXTB	OOK	Beiser, A. (1969)	. Perspectives	s of Moder	n Physic	es. McGraw	-Hill.			
SUPPORTING	REFERENCES	1. Gündüz, E. (19 Serisi No:110. 2. Taylor, J.R., Z	,	-				-		
NECESSARY MATERIALS	COURSE									

	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								
	Midtern 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									

REL	ATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THI (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)	E PRO	OGRA	M OU	TCO	MES
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.				Χ	
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.			Χ		
Prono	red by:		•			

Prepared by:

Г

Signature(s):

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COURSE CODE: 121314316

COURSE NAME: HISTORY OF SCIENCE IN PHYSICS II

SEMESTER		COURSE HOURS WEEK			CO	URSE			
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ		
4	2	0	2		2	COMPULS	E (x)		
Please depict th	e credit (for non-cre	dit courses, number of credits it	f course hour f necessary).	s per wee	ek)of the	course belo	ow (please sh	are the	
Mathematics	and Basic Sciences	if the course	s [Please depict (√) Gen			General Social lucation		I	
MEASURING	2 A ND	THEORETICAL	(x)		1				
	N ACTIVITIES		JRSES	JNIAL	LA	BORATO	RY COURS	ES	
		Activity type	Number	%	Activit	y type	Number	%	
		Midterm Exam	2	25	Midter	n Exam	-	-	
			-	-	Experin Perform	menting nance	-	-	
MIDTERM		Homework	-	-	Reporti		-	-	
		Project	-	-	Oral Ex Quiz		-	-	
		Other (Internship)	-	-	Other ()	-	-	
FINAL EXAM	[1	50			-	-	
MAKE UP EX	AM (Oral/Written)) Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUF	RSE CONTENT	Einstein's theorie Special and Gene Detailed examina	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 COURSI	The main object philosophy of so time, scientists ha	cience, and c	ultural s	tructure	that period	l by evaluati	ng the	
CONTRIBUTI COURSE TO 7 PROFESSION		Developed and modern science.	1	to-date	studies	will facilit	tate the trans	sfer of	
	UTCOMES OF	 Philosophical a sciences, Taking in con their day, Being motivate 	ijunction wit	h scienti science a	sts learn and scien	more abou tific work,	at the conditi		
MAIN TEXTB	OOK	Cemal Yıldırım.	(1997). Bilin	n Tarihi.	İstanbul	Remzi Ki	tapevi		
SUPPORTING	REFERENCES	Yavuz Unat. (192.A. O. G3.CemalYayınları4.Infeld, I	Sevim Tekeli, Esin Kaya, Remzi Demir, H. Gazi Tepdemin vuz Unat. (1997). Bilim Tarihi. İstanbul: Doruk Yayınları A. O. Gürel (2001). Doğa Bilimleri Tarihi. Ankara: İmge Kitapevi Cemal Yıldırım. (1996). Bilimin Öncüleri. Ankara: Tübita yınları Infeld, L. (Çeviri: Cemal Yıldırım / 1999). Albert Einstein/Bilimse						
		Kişiliği ve Dünva	ünyamıza Etkisi. İstanbul: Bilgi Yayınevi						

	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	r)				
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.	Χ				
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.		Χ			

COURSE CODE: 121314317

COURSE NAME: Technical English II

SEMESTER		COURSE HOURS WEEK			C	OURSE			
	Theory	Tutorial	Credit	E	CTS		TYPE		
4	2	0	2		2	COMPULS	E (x)		
Please depict the	e credit (for non-cre	dit courses, number of credits if	course hour necessary).	s per we	ek)of th	e course bel	ow (please sha	are the	
Mathematics	and Basic Sciences	Physics Subjects if the course	s [Please dej		-	General Social Education			
	2		()						
MEASURING EVALUATION	AND NACTIVITIES	THEORETICAL COU	AND TUT(RSES	ORIAL	L	ABORATO	RY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam	2	25	Midte	erm Exam			
		Quiz				rimenting rmance			
MIDTERM		Homework			Repor	rting			
		Project			Oral I Quiz	Exam or			
		Other ()			Other	·()			
FINAL EXAM			1	50					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	Г(S) IF ANY	-							
SHORT COUF	RSE CONTENT	To teach students	the concepts	s of techr	nical and	d scientific E	English.		
OBJECTIVES	OF THE COURSI					-			
CONTRIBUTI COURSE TO 7 PROFESSION		To learn how to the							
LEARNING O THE COURSE	UTCOMES OF	Various physical and technical manuscripts and easy journal articles							
MAIN TEXTB	OOK	Lecture notes.							
SUPPORTING	REFERENCES	Physics Today an	d Scientific A	Americai	n journa	ıls.			
NECESSARY MATERIALS	COURSE	AV materials are	required.						

	COURSE SCHEDULE							
WEEK	SUBJECTS							
1	Basics of technical English							
2	Grammar review							
3	The verbal uasages							
4	Analysis of a technical paper							
5	Midterm Exam1							
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)

	(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			

COURSE CODE: 121314318

COURSE NAME: THERMAL PHYSICS

SEMESTER	NUMBER OF COU WE				CC	DURSE			
	Theory	Tutorial	Credit	Е	CTS		TYPE		
4	2	0	2		2	COMPUL	COMPULSORY () ELECTIVE		
Please depict	the credit (for non-cre		f course hour f necessary).	s per wee	k)of the	course below	w (please shar	e the	
Mathematics	and Basic Sciences	Physics Subjects the course	Physics Subjects [Please depict ($$) if the course include design significantly]			General Soc lucation		1	
MEASURING ACTIVITIES	AND EVALUATION		L AND TUTO	ORIAL	I	ABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam Quiz	2	25		erm Exam			
						rimenting			
MIDTERM		Homework				rmance			
		Project			Repoi	Exam or			
		110jeet			Quiz				
		Other ()				()			
FINAL EXAM			1	50					
MAKE UP EXA	AM (Oral/Written)	Written							
PREREQUISIT	Г(S) IF ANY	Modern physics, 7	Fhermodynam	nics, Diffe	erential l	Equations I-I	Ι		
SHORT COUR	SE CONTENT	Fundamental cor equilibrium; heat transfer by conduc exchangers.	flux; equation ction; heat tra	n of heat nsfer by r	conducti adiation	ion and its so ; heat transfe	olution metho er by convecti	ds; heat	
OBJECTIVES	OF THE COURSE	To learn of fundar	mentals of the	heat tran	sfer and	calculations	5		
CONTRIBUTI COURSE TO T PROFESSION		To learn and apply	y heat transfer	r calculati	ions and	applications			
LEARNING O COURSE	UTCOMES OF THE	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							
MAIN TEXTB	OOK	Gain a knowledge Çengel, Y. A. (20				approach. B	oston: McGra	w Hill.	
SUPPORTING	REFERENCES	John Wiley & Sor Çengel, Y. A. (19 McGraw Hill. Kakaç, S. (1982). Özemre, A. Y. (1	 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 Prensibleri. İzmir: Ege Üniversitesi Yayınları. 						
NECESSARY MATERIALS	COURSE							*	

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 2: Middle 2: Low 1: Very low)

(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.		Χ			
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.		Χ			



COURSE CODE: 121314319

COURSE NAME: Astrophysic

SEMESTER	NUMBER OF COU WE				CO	URSE				
	Theory	Tutorial	Credit	E	СТЅ		ТҮРЕ			
4	2	0	2		3	COMPULSORY (x) ELECTIVE ()				
Please depict	t the credit (for non-cre		of course hour f necessary).	rs per weel	k)of the	course belo	w (please sha	re the		
Mathematic	s and Basic Sciences	Physics Subjects the course	• /			eneral ucation	Soci	al		
MEASURING ACTIVITIES	1 AND EVALUATION		() L AND TUT URSES	ORIAL	L	ABORATO	DRY COUR	SES		
		Activity type	Number	%	Activi	ty type	Number	%		
		Midterm Exam	1	50		rm Exam	2	25		
MIDTERM		Quiz				imenting mance				
		Homework			Repor					
		Project			Quiz	xam or				
		Other ()			Other	()				
FINAL EXAM			1	50			1	50		
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	Γ(S) IF ANY	-								
SHORT COUP	RSE CONTENT	Observational dat distences in cosm of universe, theor dynamics of theor	ology, Hubbl retical cosmo retical model,	e's law, as plogy, me special ur	stronomi tric and niverse n	cal data out knematics nodels, Big	side of optics of theorotica bang.	, density		
OBJECTIVES	OF THE COURSE	To introduce both	basics of cos	smology a	nd the pl	nysics of un	iverse.			
CONTRIBUTI	ГНЕ	Students will learn how to examine structure of the universe based on the principles of cosmology and relativity.								
	SIONAL TRAINING 1 Apply knowledge of natural sciences (Mathematics, Physics, Chemi 1. Apply knowledge of natural sciences (Mathematics, Physics, Chemi 2. Identify, formulate, and solve field related problems 3. Design and conduct experiments as well as to analyze and interpret 4. Interdisciplinary knowledge association and application 5. Direct correlation and application						ret data nology			
MAIN TEXTB	OOK	Özemre, A.Y., "K Yayınları, İstanbu	Cozmolojiye (Giriș", İsta	nbul Ün	iversitesi Fe	en Fakültesi			
SUPPORTING	REFERENCES									
NECESSARY MATERIALS	COURSE									

	COURSE SYLLABUS						
WEEK	TOPICS						
1	Observational data of cosmology						
2	Aim of cosmology						
3	Problem of evalution 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 radition						
14	Inflation and the early universe						
15,16							

REL	ATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THI (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)	E PRO	OGRA	M OU	TCO	MES
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.				Χ	
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.			Χ		
Prepa	red by:					

Signature(s):



COURSE CODE: 121314320

COURSE NAME: Medical Physics

	NUMBER OF COL	IDSE HOUDS PER	SE HOURS PER						
SEMESTER		EEK			CO	DURSE			
	Theory	Tutorial	Credit	F	CTS				
4	2	0	2		3	COMPULSORY (x) ELECTIVE ()			
Please depict	the credit (for non-cr	edit courses, number o credits i	of course hour f necessary).	rs per wee	k)of the	course below	w (please shar	re the	
Mathematics	and Basic Sciences	Physics Subjects the course	• /			eneral ucation	Socia	al	
	1		()						
MEASURING ACTIVITIES	AND EVALUATIO		L AND TUT URSES	ORIAL	Ι	LABORATO	DRY COURS	SES	
		Activity type	Number	%		ity type	Number	%	
		Midterm Exam	1	50	Midte	erm Exam	2	25	
MIDTEDM		Quiz				rimenting rmance			
MIDTERM		Homework			Repo	rting			
		Project			Oral I Quiz	Exam or			
		Other ()			Other	·()			
FINAL EXAM			1	50		<u> </u>	1	50	
MAKE UP EX	AM (Oral/Written)	Written						· · · · · · · · · · · · · · · · · · ·	
PREREQUISI	Γ(S) IF ANY	-							
SHORT COUF	RSE CONTENT	Molecular mech fundamentals of s						physical	
OBJECTIVES	OF THE COURSE	Investigate and u systems by using			ystems a	and processe	es take place	in these	
CONTRIBUTI COURSE TO T PROFESSION		Associate the stud taking place at bio			knowled	ge by investi	gation of phe	nomena	
LEARNING O COURSE	UTCOMES OF THI	E Fundamental know processes by phys			ystems a	nd interpreta	tion of biolog	gical	
MAIN TEXTB	OOK	Prof.Dr. Ferit Peh	livan, Biyofi	zik, Hacet	tepe-Ta	ş, Ankara, 20	005		
Berg, H. C. (1993). Random Walks in Biology. New Jersey: Princeton U 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: Co University Press. Doi, E., Edwards, S. F. (1999). The Theory of Polymer Dynamics. Oxfor Oxford University						rnell			
NECESSARY MATERIALS	COURSE								

	COURSE SYLLABUS
WEEK	TOPICS
1	Bio-filaments ant properties of bio-filaments
2	Introduction to molecular mechanics; stress, strain and other deformation types
3	Deformation examples at cellular level ve their applications
4	Biorhelogy 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

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.				Χ	
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		1

Prepared by: Signature(s): Date:



COURSE CODE: 121315416

COURSE NAME: INTRODUCTION TO PLASMA PHYSICS I

SEMESTER		COURSE HOURS R WEEK			C	COURSE		
	Theory	Tutorial	Credit	E	стѕ		ТҮРЕ	
5	3	0	5		7	COMPUL	LSORY () ELECTIV	/E (x)
Please depict t	he credit (for non-o	credit courses, number o credits	of course hou if necessary).		eek)of t	he course be	low (please sh	nare the
	ics and Basic ences	Physics Subjects [H the course include d	·····		eneral lucation	Socia	ıl	
MEASURING EVALUATION	3 AND N ACTIVITIES	(THEORETICAL A COUR		RIAL		LABORATO	ORY COURS	SES
		Activity type	Number	%	Activ	ity type	Number	%
MIDTEDM		Midterm Exam Quiz	2	25	Expe	erm Exam rimenting rmance		
MIDTERM		Homework Project			Repor Oral I Quiz	rting Exam or		
		Other (Internship)				:()		
FINAL EXAM	[1	50	Other	()		
MAKE UP EX (Oral/Written)	AM	Written						
PREREQUISI	T(S) IF ANY	-						
OBJECTIVES	RSE CONTENT	pressure plasmas, E molecules, Photoelec secondary electrons Thermodynamic equi plasma, Plasma radiat The main objective	tric effect, w s, Thermion librium, The tion, The posi	which is nic em ion and itive colu	formed ission, electror umn the	with ions in Plasma n mobility, I cory	n the solid su collective b Diffusion of sp	orface of behavior; becies in
COURSE		characteristics.						
CONTRIBUTI COURSE TO 7 PROFESSION		The Importance of Ph Applications in indust			lasma p	physics. The	Importance of	f Plasma
LEARNING O THE COURSE	UTCOMES OF	 2.Plasma and understa 3.Plasmas in Nature. 4.Learning classificat 5. Learning the basic 6. Explain of Nature I 7.Data analyzing, eva 	 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 					
MAIN TEXTB	OOK	Ekem, N. Musa, G., A	Akan, T (2001	l), Plasm	a Physi	ics Lecture N	Notes, Eskiseh	ir.
SUPPORTING REFERENCES		Roth,A. (1995), Vac Lieberman,M., Lich Processing, New You Collision Phenomena Plasma in Material Spectroscopy, Elsevic Griem,H.R., Plasma S	tenberg,A.L., rk, Wiley-Int a in Ionized ls Fabrcatio er Publishing	Princip erscienc Gases, n, IEEI Compan	les of l e Publi Wiley E Pres	Plasma Disc cation McD ySons,Inc. C s Marr,G.V	harges And M aniekl, E.W. Grill,A. (1993	Materials (1964), 3), Cold
NECESSARY MATERIALS	COURSE							

	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						

REL	ATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THI (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)	E PRC	OGRA	M OU	TCO	MES
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.	Χ				
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.		Χ			
D	red hv: Signature(s): Date:	•	•	•		·

Prepared by: Signature(s): Date:

COURSE CODE: 121315417

COURSE NAME: SOLAR ENERGY-I

SEMESTER	NUMBER OF COU WE		COURSE							
	Theory	Tutorial	Credit	E	стя		ТҮРЕ			
5	3	0	5		7	COMPULSORY() ELECTIVE X)				
Please depict	t the credit (for non-cre		of course hour f necessary).	s per weel	k)of the	course belov	v (please shar	e the		
Mathematics and Basic Sciences		Physics Subjects the course	Physics Subjects [Please depict (√) if the course include design significantly]		General Education		Social			
	2		()			Х				
MEASURING ACTIVITIES	AND EVALUATION		L AND TUTO URSES	ORIAL	L	ABORATO	ORY COURS	ES		
		Activity type	Number	%	Activi	ty type	Number	%		
		Midterm Exam	2	25		rm Exam				
		Quiz				imenting mance				
MIDTERM		Homework			Repor	ting				
		Project				Exam or				
		Other ()				()				
FINAL EXAM			1	50						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	Γ(S) IF ANY	-								
SHORT COUF	RSE CONTENT	Forms Solar Ra	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 Sola Collectors.							
OBJECTIVES	OF THE COURSE	to provide the theoretical information about thermal solar energy								
CONTRIBUTI COURSE TO T PROFESSION		Solar thermal energy	Solar thermal energy systems design and information							
MAIN TEXTB	OOK				_			_		
SUPPORTING	REFERENCES	REFERENCES HINDRICHS; R GOSWAMI, D.Y Principles of Sola	ogi and KR	EITH, Fr	ank, Kl	REIDER, Ja				
NECESSARY MATERIALS	COURSE			· · ·						

	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 Having sufficient knowledge about mathematics, physics and the skill of 1 applying for modelling and solving of physics problems by the theoretical and Х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems Х about physics and related areas. Skill of design a complex system, device or product by applying the modern 3 design methods under realistic constraints and conditions according to a Х specified objective. Skill of the effective usage of information technology, selection, development Х 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment, experimentation, collecting data, analyzing and interpreting the results for the investigation of problems of the 5 Х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of Х 6 individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 Х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew Х oneself continuously. 9 Ethical and professional responsibility. Х Knowledge about project management, risk management and change 10 management and an awareness about sustainable development, innovativeness, Х entrepreneurship.

Х

Х

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

To have knowledge about the modern problems that are local and global.

11

12

standards.

COURSE CODE: 121315418

COURSE NAME: BIOPHYSICS I

SEMESTER		COURSE HOURS WEEK								
	Theory	Tutorial	Tutorial Credit ECTS		СТЅ		ТҮРЕ			
5	3	0	5		7	COMPULSORY () ELECTIVE (X)				
Please depict th	e credit (for non-cre	dit courses, number of credits if	course hour necessary).	s per we	ek)of th	e course belo	ow (please sha	are the		
Mathematics	and Basic Sciences	Physics Subjects if the course	s [Please dep		-	eneral ucation	Social	l		
MEASURING	3 AND	THEORETICAL	() AND TUT(
	N ACTIVITIES		RSES	JNIAL	L	ABORATO	RY COURS	ES		
		Activity type	Number	%	Activ	ity type	Number	%		
		Midterm Exam	2	25	Midte	rm Exam				
		Quiz				imenting				
MIDTERM						mance				
		Homework			Repor					
		Project				Exam or				
		Other ()			Quiz	()				
FINAL EXAM	-		1	50	Other	()				
	AM (Oral/Written)	Written	1	50						
PREREQUISI		-								
SHORT COUR	RSE CONTENT	Biological system and physical inter	actions relate	ed to the	se levels	3	-			
OBJECTIVES	OF THE COURSI	these systems by	using physica	al concep	ots			ace in		
CONTRIBUTI		Associate the students' gained physical knowledge by investigation of phenomena taking place at biological systems								
	AL TRAINING			0	5					
LEARNING O	UTCOMES OF	Fundamental know			systems	and interpre	etation of biol	ogical		
THE COURSE		processes by phys	sical point of	view						
MAIN TEXTB	OOK	Prof.Dr. Ferit Peh	livan, Biyofi	zik, Hac	ettepe-7	Taş, Ankara,	2005			
Berg, H. C. (1993). Random University Pres.Boal, D. (2002). Mechanics o Gürbüz Çelebi. (1995). Biyo Arberts B., et.al. (2002). Mod de Gennes, P-G. (1979). Scal Cornell University Press.Doi, E., Edwards, S. F. (199 Oxford University					l. New Y Fizik. İz iology o cepts in	York: Cambi zmir: Barış Y of the Cell. C Polymer Ph	ridge Pres. Zayınları Garland Scien ysics. Ithaca:			
NECESSARY MATERIALS	COURSE		-							

	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						

REL	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.		Χ				
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.		Χ				

COURSE CODE: 121315419

COURSE NAME: Ultrasound

SEMESTEI		COURSE HOURS R WEEK	COURSE					
	Theory	Tutorial	Credit	E	CTS	TY		
5	3	0	3		4	COMPULS	ORY() ELECTIV	E (x)
-			Course hour necessary).	s per wee			ow (please sh	are the
Mathemat	ics and Basic Science	if the course				neral cation	Socia	l
	2		()			Х		
MEASURIN EVALUAT	NG AND ION ACTIVITIES	THEORETICAL COU	AND TUTO RSES	ORIAL	LA	BORATO	RY COURS	ES
		Activity type	Number	%	Activit		Number	%
		Midterm Exam	2	20	Midterr			
MIDTERM		Quiz			Experir Perforn	nance		
		Homework			Reporti			
		Project			Oral Ex	am or		
					Quiz			-
FINAL EXA	A M	Other ()	1	60	Other ()		
		n) Written	1	60				1
	EXAM (Oral/Writte ISIT(S) IF ANY	nj written						
		radiation pressu	re. Reflecti	on, refl	ection a	ind diffra		coustic
	DURSE CONTENT	radiation pressu: waves.Crystal osc in gases, liquids techniques. 1. To learn 2. To gain t waves.	re. Reflecti cillators. Ultr and solids. general prop the fundamen rn ultrasonic	on, refl asonic ro Applica perties of ntal know	ection a eceiver a ation of acoustic vledge ab	and diffra- nd senders ultrasound waves. out the uses	ction of a . Ultrasound	coustic waves rement
OBJECTIV CONTRIBU COURSE T	ES OF THE COURS	radiation pressu: waves.Crystal osc in gases, liquids techniques. 1. To learn 2. To gain t waves. 3. Tom lear	re. Reflecti cillators. Ultr and solids. general prop the fundamen rn ultrasonic	on, refl asonic ro Applica perties of ntal know	ection a eceiver a ation of acoustic vledge ab	and diffra- nd senders ultrasound waves. out the uses	ction of a . Ultrasound and measu s of ultrasoni	coustic waves rement
OBJECTIV CONTRIBU COURSE T PROFESSI	ES OF THE COUR JTION OF THE O THE ONAL TRAINING G OUTCOMES OF	radiation pressu: waves.Crystal osc in gases, liquids techniques. 1. To learn 2. To gain t waves. 3. Tom lear	re. Reflecti cillators. Ultr and solids. general prop the fundamen rn ultrasonic	on, refl asonic ro Applica perties of ntal know	ection a eceiver a ation of acoustic vledge ab	and diffra- nd senders ultrasound waves. out the uses	ction of a . Ultrasound and measu s of ultrasoni	coustic waves rement
OBJECTIV CONTRIBU COURSE T PROFESSI LEARNING	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE	radiation pressure waves.Crystal osci in gases, liquids techniques. 1. To learn 2. To gain to waves. 3. Tom learn and med 1. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co.)	re. Reflecti sillators. Ultr and solids. general prop the fundamen rn ultrasonic icine.	on, refl asonic refl Applica perties of ntal know and its te S.V. (19 lamentals	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSI LEARNING THE COUF MAIN TEX SUPPORTI	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE TBOOK	radiation pressure waves.Crystal osci in gases, liquids techniques. 1. To learn 2. To gain to waves. 3. Tom learn and med 1. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co.)	re. Reflecti sillators. Ultr and solids. general prop the fundamen rn ultrasonic icine.	on, refl asonic refl Applica perties of ntal know and its te S.V. (19 lamentals	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSI LEARNING THE COUF MAIN TEX SUPPORTI	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE TBOOK NG REFERENCES RY COURSE	radiation pressure waves.Crystal osci in gases, liquids techniques. 1. To learn 2. To gain to waves. 3. Tom learn and med 1. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co.)	re. Reflecti sillators. Ultr and solids. general prop the fundamen rn ultrasonic icine.	on, refl asonic refl Applica perties of ntal know and its te S.V. (19 lamentals	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSIO LEARNING THE COUF MAIN TEX SUPPORTI NECESSAF	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE TBOOK NG REFERENCES RY COURSE	radiation pressure waves.Crystal osci in gases, liquids techniques. 1. To learn 2. To gain to waves. 3. SE 3. Tom learn and med I. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co. 3. Mason, V 1.	re. Reflecti sillators. Ultr and solids. general prop the fundamen rn ultrasonic icine.	on, refl asonic refl asonic refl perties of ntal know and its te S.V. (19 <i>lamentals</i>	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSIO LEARNING THE COUF MAIN TEX SUPPORTI NECESSAF	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE TBOOK NG REFERENCES RY COURSE	radiation pressure waves.Crystal osci in gases, liquids techniques. 1. To learn 2. To gain to waves. 3. SE 3. Tom learn and med I. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co. 3. Mason, V 1.	re. Reflecti sillators. Ultr and solids. general prop the fundamen m ultrasonic icine. . & Letcher, ess (1967); <i>Funa</i> W.P. (1992);	on, refl asonic refl asonic refl perties of ntal know and its te S.V. (19 <i>lamentals</i>	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSION LEARNING THE COUF MAIN TEX SUPPORTI NECESSAF MATERIA	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE TBOOK NG REFERENCES RY COURSE LS	radiation pressu: waves.Crystal osc in gases, liquids techniques. 1. To learn 2. To gain t waves. 3. Tom lear and med 1. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co. 3. Mason, V	re. Reflecti sillators. Ultr and solids. general prop the fundamen m ultrasonic icine. . & Letcher, ess (1967); <i>Funa</i> W.P. (1992);	on, refl asonic refl asonic refl perties of ntal know and its te S.V. (19 <i>lamentals</i>	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSION LEARNING THE COUF MAIN TEX SUPPORTI NECESSAF MATERIA	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF RSE TBOOK NG REFERENCES RY COURSE LS	radiation pressu: waves.Crystal osc in gases, liquids techniques. 1. To learn 2. To gain t waves. 3. Tom lear and med 1. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co. 3. Mason, V COURSE	re. Reflecti sillators. Ultr and solids. general prop the fundamen m ultrasonic icine. . & Letcher, ess (1967); <i>Funa</i> W.P. (1992);	on, refl asonic refl asonic refl perties of ntal know and its te S.V. (19 <i>lamentals</i>	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um
OBJECTIV CONTRIBU COURSE T PROFESSIO LEARNING THE COUF MAIN TEX SUPPORTI NECESSAF MATERIAT WEEK 1	ES OF THE COURS JTION OF THE O THE ONAL TRAINING G OUTCOMES OF SE TBOOK NG REFERENCES RY COURSE LS SUBJECTS General principles of	radiation pressu: waves.Crystal osc in gases, liquids techniques. 1. To learn 2. To gain t waves. 3. Tom lean and med 1. Beyer, R Acad. Pr 2. Blitz, J. (Pub.Co. 3. Mason, V COURSE of wave propagation e on pressure.	re. Reflecti sillators. Ultr and solids. general prop the fundamen m ultrasonic icine. . & Letcher, ess (1967); <i>Funa</i> W.P. (1992);	on, refl asonic refl asonic refl perties of ntal know and its te S.V. (19 <i>lamentals</i>	ection a ecciver at ation of acoustic vledge ab echnologi 69), <i>Phys</i> s of Ultra	Ind diffrand senders ultrasound waves. out the uses cal applicat <i>ical Ultras</i> <i>sonics</i> , New	ction of a . Ultrasound and measu s of ultrasoni tions in indus	coustic waves rement c stry Zork; um

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

RF	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						

COURSE CODE: 121315420

COURSE NAME: FLUID MECHANICS

SEMESTER	NUMBER OF COU WE		COURSE							
	Theory	Tutorial	Credit	E	CTS	TYPE				
5	3	0	3		4	COMPULS	SORY() ELECTIV	/E (x)		
Please depic	t the credit (for non-cre		of course hourse		k)of the	course below	w (please shar	re the		
Mathematic	s and Basic Sciences	Physics Subject the course		oict (√) if		eneral lucation	Socia	ıl		
	2		()							
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	I	LABORATO	ORY COURS	SES		
		Activity type	Number	%	Activ	ity type	Number	%		
		Midterm Exam	2	25	Midte	erm Exam				
MIDTERM		Quiz			Perfor	rimenting rmance				
WIID I EKWI		Homework Project			Repor					
					Quiz					
		Other ()			Other	·()				
FINAL EXAM			1	50						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	T(S) IF ANY	-								
SHORT COUL	RSE CONTENT	Pressure;Types flow;Laminer flov	w;Turbulent f	flow	1	•	equation;P	oiseuille		
OBJECTIVES	OF THE COURSE	To teach students	•							
CONTRIBUTI COURSE TO 7 PROFESSION		To teachstudents	the necessary	equipmer	nts for in	ndustrial flow	/S.			
LEARNING O COURSE	OUTCOMES OF THE	The students are taught the the concepts in fluid mechanics in an easy way.								
MAIN TEXTB	BOOK	Lecture notes	Lecture notes							
SUPPORTING	G REFERENCES	Dimensional anal	ysis subjects							
NECESSARY MATERIALS	COURSE	AV materials and	internet base	ed simulati	ons.					

	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							

R	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							

COURSE CODE: 121315421

COURSE NAME: Atmospheric Physics

SEMESTER		JRSE HOURS PER EK				COURSE				
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ			
5	3	0	3		4	COMPUL	SORY () ELECTIVI	E (x)		
Please depict	the credit (for non-cre		of course hour if necessary).	s per weel	k)of the	course below	w (please shar	e the		
Mathematics	s and Basic Sciences		s [Please depi e include desig ificantly]			eneral ucation	Socia	1		
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT(URSES	ORIAL	I	ABORATO	ORY COURS	ES		
		Activity type	Number	%	Activ	ity type	Number	%		
		Midterm Exam	2	25		rm Exam				
MIDTERM		Quiz			Perfo	imenting rmance				
MIDIERM		Homework			Reporting					
		Project			Quiz	Exam or				
		Other ()			Other	()				
FINAL EXAM			1	50						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	Γ(S) IF ANY	-								
SHORT COUR	RSE CONTENT	Gravitaion, Mag	Big Bang Theory, Universe, Solar System, Sun, Solar Winds, Geomangetisma, Gravitaion, Magnetosphere, Atmosphere, İonosphere, Propogation of Radio Wave, Space vehicle processing.							
OBJECTIVES	OF THE COURSE	To define the know	To define the knowledge which is required to express, understand and formulate atmospheric physics basic concepts.							
CONTRIBUTI COURSE TO T PROFESSION		To define and and interdisciplinary of						in		
	UTCOMES OF THE	Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)								
MAIN TEXTB	OOK	Bagner D. G. (2010), An Introduction to Atmospheric Physics, New York, Cambridge Univ. Pres.								
SUPPORTING	REFERENCES	 Fleagle, R.G. and Busigner, J. A. (1980), An Introduction to Atmospheric Physics, NewYork: Academic Pres. Salby, M.L. (1996). Fundamentals of Atmospheric Physics. California: Elsevier. Aslan, Z., Topçu, S., Barla, C. Ve Özdemir, G. (2004), Atmosfer Fiziği, İstanbul: Papatya Yayınları. 								
NECESSARY MATERIALS	COURSE	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	İonosphere								
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) **PROGRAM OUTCOME** NO 5 4 3 2 1 Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and 1 х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern 3 design methods under realistic constraints and conditions according to a X specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 х individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew х oneself continuously. 9 Ethical and professional responsibility. Х Knowledge about project management, risk management and change 10 management and an awareness about sustainable development, innovativeness, Х entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results 11 X 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. х

COURSE CODE: 121316356

COURSE NAME: Introduction to Plasma Physics II

SEMESTER		COURSE HOURS WEEK								
	Theory	Tutorial	Credit	E	СТЅ	ТҮРЕ				
6	3	0	3		5 COMPU	LSORY () ELECTIV	E (x)			
Please depict th	e credit (for non-cre	dit courses, number of credits if	f course hour necessary).	s per wee	ek)of the course be	clow (please sh	are the			
Mathematics	and Basic Sciences	Physics Subject if the course	s [Please dep		General Education					
MEASURING EVALUATIO	5	THEORETICAL	AND TUTO	ORIAL	LABORAT	ORY COURS	ES			
Lintenno		Activity type	Number	%	Activity type	Number	%			
		Midterm Exam	2	25	Midterm Exam					
		Quiz			Experimenting					
					Performance					
MIDTERM		Homework			Reporting					
		Project			Oral Exam or					
					Quiz					
		Other (Internship)			Other ()					
FINAL EXAM	[1	50						
MAKE UP EX	AM (Oral/Written) Written								
PREREQUISI	T(S) IF ANY	-								
SHORT COUI	RSE CONTENT	Townsend discha first Townsend discharge; Discha	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 COURS	True as and about a	Types and characteristics of electrical discharge							
CONTRIBUTI COURSE TO 7 PROFESSION		characteristics of Arc discharge,an evaluating, testin	the learning alysis to ex- ng and des iation and in	g for low plain nat sign, acc mplemen	electrical discharg v-pressure dischar tural phenomena, uuired the inform tation, team work	ges, Glow disc to analyze the nation directly	charge, e data, v with			
LEARNING O THE COURSE	DUTCOMES OF	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 TEXTE	BOOK	Ekem, N. Musa, O	G., Akan, T ((2001), P	lasma Physics Lec	ture Notes, Esk	tisehir.			
SUPPORTING	G REFERENCES	Lieberman,M., Materials Proces WileySons,Inc. (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							

	COURSE SCHEDULE							
WEEK	UBJECTS							
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 (Moleculer 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)

	(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.	Χ						
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.		Χ					

COUR	RSE CODE: 12131	6357	CO	DURSE N.	AME: S	SOLAR EN	ERGY-II	
SEMESTER		COURSE HOURS WEEK		URSE				
	Theory	Tutorial	Credit	Ε	CTS			
6	3	0	3		5	ZORU	NLU() SEÇMELİ(.	X)
Please depict	the credit (for non-c	redit courses, number credits	of course hou if necessary)		ek)of the	course belo	ow (please sha	re the
Mathematics	and Basic Sciences	the course	Physics Subjects [Please depict (√) if the course include design significantly]			neral cation		
	2		()					
MEASURING EVALUATION		THEORETICA CO	L AND TUT URSES	ORIAL	L	ABORATO	ORY COURS	ES
		Activity type	Number	%	Activit		Number	%
		Midterm Exam	2	25		m Exam		
		Quiz			Perform	menting		
MIDTERM		Homework			Report			
		Project			Oral E: Quiz			
		Other ()			Other ([)		
FINAL EXAM		Written	1	50				
MAKE UP EX	AM (Oral/Written) Written						
PREREQUISI	Γ(S) IF ANY	-						
	RSE CONTENT	Solar Energy, Po energy applicati structure, power s How to gain know	ons, semico station with so	nductor ()lar batteri	photovol es, solar	taic) solai cells applic	cells, solar ations.	
CONTRIBUTI COURSE TO T PROFESSION		Solar battery tech	nology to inc	rease stud	ents' knov	wledge in a	reas related to	work
	UTCOMES OF	Apply knowledge Identify, formulat Design and condu Interdisciplinary I Direct correlation industry Get a recognition Gain a knowledge	e, and solve f act experiment knowledge as and application of the need for	ield relate ts as well sociation a on of gain or, and an	d probler as to anal and appli- ed know ability to	ns lyze and int cation ledge with	erpret data technology an	
MAIN TEXTB	ООК							
SUPPORTING	REFERENCES	REFERENCES Richard J.KOMP Peter WÜRFEL(Roger A. HİNDR Jef Poortmans and Characterization a Jean-Pierre Colin Devices, Spring AndEnviroment. (2000) Principles	2005),Physic İCHS;(1996) d Vladimir Ar and Applicat ge and Cynth ger. HİNDI GOSWAMI,	s of Salar Energy It khipov (2 ions John ia A. Coli RICHS; D.Yog1	Cells. s Use An 007), Thi Wiley an inge (200 Roger and KRE	d Envirom in Films So d Sons, Ltd 05), Physi A.;(1996) EITH, Franl	ent. lar Cells Fabr cs of Semicor Energy It	ication, nductors s Use
NECESSARY MATERIALS	COURSE							

	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 Having sufficient knowledge about mathematics, physics and the skill of 1 applying for modelling and solving of physics problems by the theoretical and Х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying appropriate analysis and modelling method for the complex physics problems Х 2 about physics and related areas. Skill of design a complex system, device or product by applying the modern 3 design methods under realistic constraints and conditions according to a Х specified objective. Skill of the effective usage of information technology, selection, development Х 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment experimentation collecting data

5	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.		Χ		
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.		Χ		

COURSE CODE: 121316358

COURSE NAME: BIOPHYSICS II

SEMESTER	NUMBER OF COU WE				CO	URSE		
	Theory Tutorial Credit		Ε	стя		ТҮРЕ		
6	3	0	3		5	COMPULSORY () ELECTIVE		
Please depict	t the credit (for non-cre		of course hour f necessary).	s per weel	k)of the	course belov	v (please shar	e the
Mathematic	s and Basic Sciences		s [Please dep include desi ificantly]			eneral ucation	Socia	1
MEASUDINC	3 AND EVALUATION	THEORETICA						
ACTIVITIES	ANDEVALUATION		URSES	URIAL	L	ABORATC	ORY COURS	ES
		Activity type	Number	%		ity type	Number	%
MIDTERM		Midterm Exam Quiz	2	25	Experi	rm Exam imenting mance		
IVIID I E KIVI		Homework Project			Reporting Oral Exam or Quiz			
		Other ()				()		
FINAL EXAM			1	50				
MAKE UP EX	AM (Oral/Written)	Written						
PREREQUISI	Г(S) IF ANY	-						
SHORT COUF	RSE CONTENT	Molecular mech fundamentals of s	eeing and hea	aring, expe	erimenta	l techniques		
OBJECTIVES	OF THE COURSE	Investigate and u systems by using			ystems a	nd processe	s take place	in these
CONTRIBUTI COURSE TO T PROFESSION		Associate the stud taking place at bio	ological system	ms			с I	
LEARNING O COURSE	UTCOMES OF THE	Fundamental know processes by phys			stems ar	nd interpreta	tion of biolog	ical
MAIN TEXTB	OOK	Prof.Dr. Ferit Peh	llivan, Biyofiz	zik, Hacet	tepe-Taș	, Ankara, 20	005	
SUPPORTING	REFERENCES	Pres. Boal, D. (2002). Gürbüz Çelebi. (Arberts B., et.al. de Gennes, P-G. University Press.	ds, S. F. (1999). The Theory of Polymer Dynamics. Oxford:					
NECESSARY MATERIALS	COURSE							

	COURSE SCHEDULE					
WEEK	SUBJECTS					
1	Bio-filaments ant properties of bio-filaments					
2	Introduction to molecular mechanics; stress, strain and other deformation types					
3	Deformation examples at cellular level ve their applications					
4	Biorhelogy 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					

RF	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.		Χ					
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.		Χ					

COURSE CODE: 121316359

COURSE NAME: INTRODUCTION TO LASER PHYSICS

SEMESTER		URSE HOURS PER EEK			C	OURSE			
	Theory	Tutorial	Credi	t E	CTS	ТҮРЕ			
6	3	0	3		4	COMPULS	CTIVE (
Please depict	the credit (for non-cre	edit courses, number of credits if	course ho		ek)of th	e course belo	ow (please sł	nare the	
Mathematic	Mathematics and Basic Sciences		(Please depict (√) General include design icantly]						
	3		()						
MEASURINO EVALUATIO	G AND ON ACTIVITIES		RSES			ABORATO			
		Activity type	Number	%	-	vity type	Number	%	
		Midterm Exam	2	20		erm Exam			
		Quiz				rimenting rmance			
MIDTERM		Homework			Repo		1		
		Project				Exam or			
		J			Quiz				
		Other ()			Other	: ()			
FINAL EXA			1	60					
	XAM (Oral/Written)	Written							
PREREQUIS	SIT(S) IF ANY	- The main aim		<u> </u>	.				
SHORT COU	JRSE CONTENT	lasers.Teaching (Mathematics, phenomena, Ide Design and con data, Interdiscip	Physics, entify, for iduct expe	Chemist rmulate, eriments	ry), J and so as wel	ustify and olve field l as to ana	analyze related pro lyze and in	natural oblems,	
OBJECTIVE	S OF THE COURSI	The main aim of t laser physics, Ap Chemistry), Justit solve field related analyze and into application	ply knowl fy and ana d problems	edge of r lyze natur , Design	natural al phen and con	sciences (Ma omena, Iden nduct experii	athematics, tify, formul ments as we	Physics, ate, and ell as to	
CONTRIBUTI TO THE PRO TRAINING	ON OF THE COURS FESSIONAL	E							
LEARNING THE COURS	OUTCOMES OF SE								
MAIN TEXT	BOOK								
SUPPORTIN	G REFERENCES	 Laser Ele Principle Lasers Pr Prentice 	ectronics- J s of Lasers rinciples an Hall, 1987.	oseph T. V , Orazio S d Applica	/erdeye velto, P tions, J.	, Değişim Ya n, Prentice H lenum Press, Wilsom, J.F röder, Spring	all 1989. 1989. .B. Hawkes,		
NECESSARY MATERIALS									

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

REL	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				

COURSE CODE: 121316360

COURSE NAME: SEMICONDUCTORS PHYSICS I

SEMESTER		COURSE HOURS WEEK			CO	URSE			
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ		
6	3	0	3		4	COMPULSORY () ELECTIVE (
Please depict th	e credit (for non-cre	dit courses, number of credits if	course hour necessary).	s per wee	ek)of the	course belo	ow (please sh	are the	
Mathematics	and Basic Sciences	if the course				neral cation	Social		
MEASURING	3	THEORETICAL							
	AND NACTIVITIES		AND TUIC RSES	JRIAL	LA	BORATO	RY COURS	ES	
		Activity type	Number	%	Activit	y type	Number	%	
		Midterm Exam	2	25		m Exam			
MIDTERM		Quiz			Experin Perform	menting nance			
MIDIERNI		Homework			Report				
		Project			Oral Ex Quiz				
		Other ()			Other ()			
FINAL EXAM			1	50					
MAKE UP EX	AM (Oral/Written	Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUF	RSE CONTENT	Band formation Intrinsic and extr Fermi level, Con Semiconductor u Optical properties	insic semico duction mee nder tempe	onductors chanisms rature, S	, Electri , Semico	cal conduct onductors u	tivity and mo inder electric	bility, field,	
OBJECTIVES	OF THE COURS	To realize the	basics of		nductors	physics	and the ro	ole of	
CONTRIBUTI COURSE TO T	ГНЕ	1. To teach the rol 2. To provide a be						1	
PROFESSION	AL TRAINING	material sciences.							
LEARNING O THE COURSE	UTCOMES OF	 Knows the basic Knows the Knows the technology. 	ne physical p	roperties	of semic	conductor r			
MAIN TEXTB	OOK	John P. McKelve	ey, Solid Sta	te and Se	micondu	ctor Physic	S		
SUPPORTING	REFERENCES	 Jacques S. Wang Physics 	I. Pankove, , Fundamen	Kelvey, Solid State and Semiconductor Physics Pankove, Optical Processes in semiconductors undamentals of Semiconductor Theory and Device aşif ONARAN, Malzeme Bilimi					
NECESSARY MATERIALS	COURSE			,					

	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					

REL	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.		х						
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						

COURSE CODE: 121316361

COURSE NAME: DIGITAL ELECTRONICS-I

SEMESTER		COURSE HOURS WEEK			C	DURSE				
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ			
6	3	0	3		4	ZORUNLU() SEÇMELİ(x)				
Please depict the	e credit (for non-cre	dit courses, number of credits if	f course hour f necessary).	s per wee	ek)of th	e course belo	ow (please sha	are the		
Mathematics	and Basic Sciences	if the course	Physics Subjects [Please depict (if the course include design significantly]			General So Education		l		
	2		0							
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAL COU	AND TUTC	ORIAL	L	ABORATO	RY COURS	ES		
		Activity type	Number	%		ity type	Number	%		
		Midterm Exam	2	20		rm Exam				
		Quiz				imenting				
MIDTERM						mance				
		Homework			Repor					
		Project			Quiz	Exam or				
		Other ()			<u> </u>	()				
FINAL EXAM			1	60	Other	()				
	AM (Oral/Written		1	00						
PREREQUISI		,								
	RSE CONTENT	Number systems Boolean algebra,						tals of		
OBJECTIVES	OF THE COURSI	E The main object Electronics.	of the course	e is to pi	ovide a	basic under	rstanding of	digital		
CONTRIBUTI COURSE TO T PROFESSION										
		1. Understa	and computer	· circuits	and blo	cks				
			w to simplify							
	UTCOMES OF		achine langu							
THE COURSE			formulate, a							
			5. Direct correlation and application of gained knowledge with technology and industry							
MAIN TEXTB	OOK									
		1. Howard	l, M. Berlin ((1985). [Digital E	lectronics ar	nd experiment	ts,		
			Reston Publis							
						Electronic c	ircuits. Lond	on;		
SUPPORTING	REFERENCES		– Hall Intern			D) Electro '	a daniero - 1			
			id, R. & Nas ieory. New Jo				c devices and	l		
							nputer Techno	ology		
			rk; John Wile			2151001 001	The second second	-106J.		
NECESSARY MATERIALS	COURSE		,	~						

	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.			Х				
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				

COURSE CODE: 1213*****

COURSE NAME: SPECTRAL ANALYSIS TECHNIQUES I

SEMESTER		JRSE HOURS PER EEK			CC	DURSE			
	Theory	Tutorial	Credit	E	СТЅ		TYPE		
6	3	0	3		4	COMPULSORY () ELECTIVE (x)			
Please depict	the credit (for non-cr		of course hou f necessary).		k)of the	course below	w (please shar	e the	
Mathematics	and Basic Sciences	the course	Physics Subjects [Please depict (√) if the course include design significantly]			eneral ucation	Socia	1	
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	I	ABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam				rm Exam			
MIDTEDM		Quiz			Exper	imenting mance			
MIDTERM		Homework	2	25	Repor	ting			
		Project			Quiz	Exam or			
		Other ()			Other	()			
FINAL EXAM			1	50					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	Γ(S) IF ANY	-							
SHORT COUR	RSE CONTENT	Spectroscopic kr mechanisms, spra					, Thin film		
OBJECTIVES	OF THE COURSE	To teach the the coach equipped improve the exper	ory of spect students for	roscopic to thin film	echnique 1 techno	es used in s	tructure anal	ysis. To	
CONTRIBUTI		To have knowledge on Spectral analysis techniques. To learn and apply thin							
COURSE TO T		film coating Technologies, to realize the semicondcutor technology and its							
PROFESSION	AL TRAINING	importance.	1 1 ^		~	<u>, 1 ;</u>	™ '~1	• . 、	
LEARNING O COURSE	UTCOMES OF THE	 Identify, Design a Interdisc Direct cc and indu Get a rec learning 	 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 						
MAIN TEXTB	OOK	Instrümental Ana	7. Gain a knowledge of contemporary issues Instrümental Analiz, Turgut Gündüz The Materials Science of Thin Films, Milton Ohring						
SUPPORTING	REFERENCES								
NECESSARY MATERIALS	NECESSARY COURSE Available devices in thin film production Research Laboratory and Semicon MATERIALS Characterization Research Laboratory, consumables for materials to be student								

	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							

RF	RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM								
NO	(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low) PROGRAM OUTCOME	5	4	3	2	1			
	Having sufficient knowledge about mathematics, physics and the skill of	3	4	5	2	1			
1	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.			Χ					
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.			Χ					

COURSE CODE: 121316362

COURSE NAME: INSTRUMENTAL ANALYSIS METHODS-I

SEMESTER		COURSE HOURS WEEK		COURSE					
	Theory	Tutorial	Credit	E	стѕ		TYPE		
6	3	0	3		5	COMPULS	ORY() ELECTIVE	(X)	
Please depict th	e credit (for non-cr	edit courses, number o credits i	f course hour f necessary).	s per wee	ek)of the	e course belo	ow (please sha	are the	
Mathematics	and Basic Science	s Physics Subject if the course				eneral ucation	Social		
	3		()						
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAI	L AND TUTC URSES	JRIAL	LA	ABORATO	RY COURSI	ES	
		Activity type	Number	%	Activi	ty type	Number	%	
		Midterm Exam	2	25		rm Exam			
MIDTERM		Quiz				imenting mance			
MIDICKNI		Homework			Report				
		Project			Oral E Quiz	xam or			
		Other ()			Other	()			
FINAL EXAM			1	50					
	AM (Oral/Written	n) Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUL	RSE CONTENT	Spectroscopic spectroscopy; the	e ultraviolet a	nd visible	e spectro	oscopy.		orptior	
OBJECTIVES	OF THE COURS	E Information on t instrumental me obtain							
CONTRIBUTI COURSE TO 7 PROFESSION			analysis, whi lecision, whe	ch metho n the des	od / meth ired / rec	nods to use t quired degre	he laboratory		
LEARNING O THE COURSE	UTCOMES OF	 Instrumental n importance. Describes the them. Describes the radiation. Compare the s Instrumental n necessary theoret Spectroscopic Atomic absorp differences. AAS obtained Explains and i 	 Describes the wave and particle character of Ray, associate and analyze them. Describes the events that may occur as a result of interaction of matterradiation. Compare the spectra of atomic and molecular absorption and comments. Instrumental methods of data tell the indispensability of taking the necessary theoretical knowledge. Spectroscopic methods, explains the differences / similarities are discussed. Atomic absorption spectroscopy identifies, explains the principles, tell the 						
MAIN TEXTB	OOK	Gündüz, T., "İns		aliz", Ga	zi Kitabo	evi, 2002.			
	REFERENCES	1. Erdik,E."Orga 2. Douglas, A., S Instrumental Ana	koog, F., Hol	ller, J., N	ieman, T	Г. А., "Princ	ples of	1998.	
NECESSARY MATERIALS	COURSE	Computer, projec			0-1401		-		

	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 Having sufficient knowledge about mathematics, physics and the skill of Х 1 applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying Х 2 appropriate analysis and modelling method for the complex physics problems about physics and related areas. Skill of design a complex system, device or product by applying the modern Х 3 design methods under realistic constraints and conditions according to a specified objective. Skill of the effective usage of information technology, selection, development Х 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment, experimentation, collecting data, Х 5 analyzing and interpreting the results for the investigation of problems of the chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of Х 6 individual working. Skill of effective communication orally and in writing in Turkish and ability of Х 7 using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, Х 8 following the scientific and technological developments and ability of renew oneself continuously. Х 9 Ethical and professional responsibility. Knowledge about project management, risk management and change Х 10 management and an awareness about sustainable development, innovativeness, entrepreneurship. The knowledge about the effects of physics practices socially and globally which Х are related to health, environment and security; awareness about the legal results 11 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. Х



COURSE CODE: 121317555 COURSE NAME: APPLICATIONS OF LASER

SEMESTER	NUMBER OF COU WE				C	OURSE			
	Theory	Tutorial	Credi	t E	CTS		ТҮРЕ		
-	2	0	2		-	COMPULS	ECTIVE		
7	3	0	3		5		(X)		
Please depict t	the credit (for non-cred		course ho		ek)of th	e course belo	ow (please sl	hare the	
Mathematic	s and Basic Sciences	Physics Subjects if the course signif) General Education		Socia	al	
MEASURING EVALUATIO	G AND ON ACTIVITIES	THEORETICAL	AND TUT RSES	FORIAL	L	ABORATO	RY COURS	SES	
		Activity type	Numbe	%	Activ	ity type	Numbe r	%	
MIDTERM		Midterm Exam Quiz	2	25	Exper Perfo	erm Exam rimenting rmance			
		Homework Project Other ()			Quiz	rting Exam or : ()			
FINAL EXA	M		1	50	Other	()			
	XAM (Oral/Written)		_						
PREREQUIS	SIT(S) IF ANY								
SHORT COL	JRSE CONTENT	The main ain Laser applica	tion, Apply	knowled	ge of na	tural science	s	-	
OBJECTIVE	S OF THE COURSE	Laser application Physics, Chemis formulate, and so as well as to association and ap	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						
COURSE TO	FION OF THE D THE NAL TRAINING								
LEARNING THE COURS	OUTCOMES OF SE	, Use new techno software to analy		nodern tec	hniques	such as com	puter and co	omputer	
MAIN TEXT	воок								
SUPPORTIN	 Laser Principles and Application, J. Wilson, J.F.B. Hawkes, Prenti- Hill, 1989. Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989. Principles of Lasers, Orazio Svelto, Plenum Press, 1989. Enstrümental Analiz İlkeleri, Douglas A. Skoog, F. James Holler, Timothy A. Niemann, Bilim Yayıncılık, 1997. 								
NECESSARY MATERIALS		Thiotily	<u> </u>	, 211111	i uj met	im, 1797.			

	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.							

COURSE CODE: 121317556

COURSE NAME: SEMICONDUCTORS PHYSICS II

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE						
	Theory	Tutorial	Credit	E	СТЅ		TYPE		
7	3	0	3		5	COMPUL	OMPULSORY () ELECTIVE (x)		
-	the credit (for non-cre	credits i	if necessary).	•	-		-		
Mathematics and Basic Sciences			s [Please dep include desi ificantly]		General Education		Social		
MEASUDINC	3 AND EVALUATION		()	ODIAI					
ACTIVITIES	AND EVALUATION	CO	THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES			
		Activity type	Number	%	Activit		Number	%	
		Midterm Exam	2	25	Midterm Exam				
		Quiz			Experimenting				
MIDTERM		TT 1			Perform				
		Homework			Reporting				
		Project			Oral Exam or				
					Quiz	· .			
		Other ()	1	50	Other (()		 	
FINAL EXAM	AM (Oral/Written)	Written	1	50				L	
PREREQUISI	· · · · · · · · · · · · · · · · · · ·	-							
SHORT COUF	RSE 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.							
CONTRIBUTI COURSE TO T PROFESSION		 To teach the role of semiconductor devices in technological applications. To provide a better understanding of semiconductor devices in electronic and material sciences. 							
LEARNING O COURSE	UTCOMES OF THE	5. Knows th 6. Knows th technology.	6. Knows the role of semiconductor devices in everyday life and technology.						
MAIN TEXTB	OOK	M. S. Tyagi,	Introduction	to semicor	ductor m	naterials and	l devices		
SUPPORTING	REFERENCES	6. M. Shur 7. R. Boyle	 M. Shur, Physics of semiconductor devices R. Boylestad, L. Nashelsky, Electronic devices and circuit theory 						
NECESSARY MATERIALS	COURSE			1					

	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					

RF	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						

COURSE CODE: 121317557

COURSE NAME: INSTRUMENTAL ANALYSIS METHODS-II

SEMESTER		URSE HOURS PER EEK	R COURSE				
	Theory Tutorial Credit ECTS		СТЅ	ТҮРЕ			
7	3	0	3		5 COMPU	JLSORY() ELECTIV	E (X)
Please depict	the credit (for non-c	redit courses, number c credits i	of course hour f necessary).	rs per weel	x)of the course bel	ow (please shar	e the
Mathematics and Basic Sciences		Physics Subjects the course	Physics Subjects [Please depict (√) if the course include design significantly]		General Education	Social	
MEASURING ACTIVITIES	AND EVALUATIO		L AND TUT	ORIAL	LABORA	FORY COURS	ES
		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting		
MIDTERM					Performance		
MIDIERM		Homework			Reporting		
		Project			Oral Exam or		
					Quiz		
		Other ()	1	50	Other ()		<u> </u>
FINAL EXAM		XX 7.'44	1	50			
PREREQUISI	AM (Oral/Written)	Written					
OBJECTIVES CONTRIBUTI COURSE TO T		practice.	ectron Paran he substance rumental met e benefit of cl lysis, which n then the desir s as the optim oscopy identif	agnetic I cannot b hods to g assical me method / n ed / requir num. fies, indica	Resonance (EPR) e obtained by co ain the necessary thods of analysis t nethods to use the ed degree of accur ttes that explains t	spectroscopy, nventional met theoretical kno that is not analy laboratory facili- racy to gain the he principles an	X-Ray hods to owledge zes. In ities ability d
COURSE MAIN TEXTB	UTCOMES OF TH OOK REFERENCES	 3. IR spectroscop 4. Describes the oband. 5. Determined by 6. Spectroscopic 7. Nuclear Magn says the difference 8. Discusses the result of the second s	y identifies a discovery and IR spectrosc methods, exp etic Resonances. results and be nterprets the I d int	nd applies I molecula opy descri- lains the d ce spectros nefits obta EPR spectro e changes liz", Gazi Spektrosko er, J., Nier	in material proper Kitabevi, 2002. opik Yöntemler"G nan, T. A., "Princ	ivity. ination of the fro wen substance. rities are discus cplains the princ lysis. ties as a result o azi Kitabevi, 19	equency sed. iples, of 98.
NECESSARY MATERIALS	COURSE	Analysis", Saunde Computer, projec		uonsning,	1770.		

	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 Having sufficient knowledge about mathematics, physics and the skill of Х 1 applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying Х 2 appropriate analysis and modelling method for the complex physics problems about physics and related areas. Skill of design a complex system, device or product by applying the modern Х design methods under realistic constraints and conditions according to a 3 specified objective. Skill of the effective usage of information technology, selection, development Х 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment, experimentation, collecting data, Х 5 analyzing and interpreting the results for the investigation of problems of the chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of Х 6 individual working. Skill of effective communication orally and in writing in Turkish and ability of Х 7 using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, Х 8 following the scientific and technological developments and ability of renew oneself continuously. 9 Ethical and professional responsibility. Х Knowledge about project management, risk management and change Х management and an awareness about sustainable development, innovativeness, 10 entrepreneurship. The knowledge about the effects of physics practices socially and globally which Х are related to health, environment and security; awareness about the legal results 11 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. Х

COURSE CODE: 121317558

COURSE NAME: DIGITAL ELECTRONICS-II

SEMESTER	NUMBER OF COU WE					COURSE			
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ		
7	3	0	3		5 ZORUNLU () SEÇMEL			(x)	
Please depict	t the credit (for non-cre		of course hour f necessary).	s per weel	c)of the	course below	v (please shar	e the	
Mathematic	s and Basic Sciences	the course	Physics Subjects [Please depict ($$) if the course include design significantly]			eneral acation	Social		
MEASURING ACTIVITIES	2 AND EVALUATION		() L AND TUT URSES	ORIAL	L	ABORATO	ORY COURS	ES	
ACTIVITIES		Activity type	Number	%	Activi	ty type	Number	%	
		Midterm Exam	2	20		rm Exam	1 (uniber	70	
		Quiz		20		imenting			
MIDTERM		Homework			Repor	ting			
		Project				xam or			
		Other ()			Other	()			
FINAL EXAM	[1	60					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUR	RSE CONTENT	Multivibrator circ control, computer	memory, arit	hmetic op	erations	, input/outpu	it operations	•	
OBJECTIVES	OF THE COURSE	The main object Electronics.	of the cours	e is to p	ovide a	basic unde	rstanding of	digital	
CONTRIBUTI COURSE TO 7 PROFESSION									
LEARNING O COURSE	UTCOMES OF THE	 Understa Identify, Direct co and indu 	 Understand Counter and data transfer registers Identify, formulate, and solve field related problems 					nology	
MAIN TEXTB	OOK								
SUPPORTING	REFERENCES	 Reston; I 2. Glasford Prentice 3. Boylesta theory. N 	 vard, M. Berlin (1985). Digital Electronics and experiments, on; Reston Publishing company sford, Glenn M. (1988). Digital Electronic circuits. London; tice – Hall International Editions lestad, R. & Nashelsky, L. (1978). Electronic devices and circuit ry. New Jersey, Prentice-Hall Inc. xy, L. (1977). Introduction to Digital Computer Technology. New hn Wiley & Sons 						
NECESSARY MATERIALS	COURSE		2						

	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 3 4 2 1 Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and 1 x experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the x chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 х individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew х oneself continuously. 9 Ethical and professional responsibility. X Knowledge about project management, risk management and change 10 management and an awareness about sustainable development, innovativeness, Х entrepreneurship. 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 11 Х solutions and national and international legal regulation and the standards. 12 To have knowledge about the modern problems that are local and global. X

S D M D S T D D		RSE HOURS PER				URSE	OLOGY		
SEMESTER	WE Theory	EK Tutorial	Credit	Е	ECTS TYPE				
7	3	0	3		5	COMPULSORY () ELECTIVE			
Please depict	the credit (for non-cre		of course hour if necessary).	s per wee	k)of the	course below	v (please share	e the	
Mathematics	and Basic Sciences	Physics Subject the course				eneral ucation	Social	Social	
	3 AND EVALUATION			ORIAL	L	ABORATO	ORY COURS	ES	
ACTIVITIES		Activity type	URSES Number	%		ity type	Number	%	
MIDTERM		Midterm Exam Quiz Homework	2	20	Midte Exper	rm Exam imenting mance			
		Project Other ()			Oral E Quiz	Exam or ()			
FINAL EXAM			1	60	Other	()			
MAKE UP EXA	AM (Oral/Written)	Written							
PREREQUISIT	Γ(S) IF ANY	-							
SHORT COUR	RSE CONTENT	Observational da distences in cosm of universe, theo dynamics of theor	ology, Hubbl retical cosmo	e's law, as ology, me	stronomi tric and	cal data outs knematics	side of optics, of theorotical	densit	
OBJECTIVES			cucui model,	special un			Jung.		
	OF THE COURSE	To introduce both							
CONTRIBUTION COURSE TO T PROFESSION	ON OF THE	To introduce both Students will lear principles of cosn	h basics of cos	mology a	nd the pl	nysics of uni	verse.		
COURSE TO T PROFESSION	ON OF THE THE	Students will lear principles of cosm 1. Learn kr 2. Learn kr 3. Apply kr 4. Justify a 5. Identify, 6. Design a 7. Use new compute 8. Interdisc 9. Get an u 10. Get reco learning	n how to exar nology and re nowledge about nowledge about nowledge of r nd analyze na formulate, ar nd conduct ex- technology a r software to iplinary know nderstanding gnition of the	mology a nine struc lativity. at structur ut relativit autural scie tural phen ad solve fi xperiment nd moder analyze ar vledge ass of profess need for,	nd the pl ture of the e of the y, cosmo ences (M oomena. eld relati s as well n technic nd mode ociation ional an and an a	nysics of uni ne universe b universe. ology, and as fathematics, as to analyz ques such as l the scientif and applicat d ethical resp bility to eng	verse. based on the strophysics. Physics). te and interpre computer and ic problems. ion.	l	
COURSE TO T PROFESSION	ON OF THE THE AL TRAINING UTCOMES OF THE	Students will lear principles of cosm1.Learn kr2.Learn kr3.Apply kr4.Justify a5.Identify,6.Design a7.Use new compute8.Interdisc9.Get an u10.Get reco learning11.Gain kmÖzemre, A.Y., "K Yayınları, İstanbu	n how to exar nology and re nowledge abor nowledge abor nowledge abor nowledge of r nd analyze na formulate, ar nd conduct ex technology a r software to iplinary know nderstanding gnition of the <u>owledge of co</u> tozmolojiye C il, 1981.	mology a nine struc lativity. at structur ut relativit atural scie tural phen ad solve fi kperiment nd moder analyze ar vledge ass of profess need for, <u>ntempora</u>	nd the pl ture of the e of the y, cosmo ences (M oomena. eld relati s as well n technic od mode ociation ional and and an a ry issues nbul Ün	nysics of uni ne universe b universe. ology, and as fathematics, as to analyz ques such as l the scientif and applicat d ethical resp bility to eng iversitesi Fer	verse. based on the strophysics. Physics). te and interpre computer and ic problems. tion. ponsibility. age in life-lon n Fakültesi	l	
COURSE TO T PROFESSION	ON OF THE THE AL TRAINING UTCOMES OF THE	Students will lear principles of cosm1.Learn kr2.Learn kr3.Apply kr4.Justify a5.Identify,6.Design a7.Use new compute8.Interdisc9.Get an u10.Get reco learning11.Gain kmÖzemre, A.Y., "K Yayınları, İstanbu1.Ryden B 2003.2.Esin, F., Yayınları3.Peebles, universi4.Saama, I	n how to exar nology and re nowledge about nowledge about nowledge about nowledge of r nd analyze na formulate, ar nd conduct ex technology a r software to iplinary known nderstanding gnition of the <u>owledge of co</u> Cozmolojiye C 1, 1981. 5., "Introduction "Görsel Uzay n, İstanbul, 19 P. J. E., "Print ty Press, Print	mology a nine struc lativity. ut structur ut relativit atural scie tural phen ad solve fi kperiment nd moder analyze ar vledge ass of profess need for, <u>ntemporat</u> biriş", İsta on to cosn v ve Kozm 1993. cceton, 199	nd the pl ture of the e of the y, cosmo ences (N omena. eld relate s as well n technic ociation ional and and an a <u>ry issues</u> nbul Ün nology", nolojiye	nysics of uni ne universe b universe. ology, and as fathematics, as to analyz ques such as l the scientif and applicat d ethical resp ibility to eng Addison Wo Giriş", İstanl Cosmology	verse. based on the strophysics. Physics). te and interpre computer and ic problems. ion. ponsibility. age in life-lon n Fakültesi esley, New Yo bul Üniversite	l ork,	

	COURSE SCHEDULE					
WEEK	SUBJECTS					
1	Observational data of cosmology					
2	Aim of cosmology					
3	Problem of evalution 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 radition					
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)

	(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				

COURSE CODE: 121317560

COURSE NAME: RENEWABLE ENERGY RESOURCES

SEMESTER		COURSE HOURS COURSE WEEK						
	Theory	Tutorial	Credit		ECTS		TYPE	
7	3	0	3		5	COMPUL	SORY() ELECTIV	E (X)
Please depict the	credit (for non-c	redit courses, number credits	of course hou if necessary)		eek)of th	e course belo	ow (please sha	re the
Mathematics and		Physics Subject the course		ict (√) if		eneral lucation	Socia	1
3 MEASURING AN EVALUATION A	D	THEORETICA	() L AND TUT URSES	ORIAL		LABORATO	ORY COURS	ES
EVALUATION A		Activity type	Number	%	Activ	ity type	Number	%
		Midterm Exam	2	25		erm Exam	i tullio ci	/0
		Quiz			Expe	rimenting rmance		
MIDTERM		Homework			Repo		1	l
		Project				Exam or		
		Other ()			Other	: ()		
FINAL EXAM			1	50				
MAKE UP EXAM	I (Oral/Written) Written						
PREREQUISIT(S) IF ANY	-						
SHORT COURSE	CONTENT	Fossil and Renew Population, Sola Biogas, Hyrdoger	r spectrum, S	Solar ter	mal ener	gy, Solar co	ells, Wind, B	
OBJECTIVES OF	F THE COURS	E Renewable Energ	ies recognize	, inform	you abou	t global warı	ning	
CONTRIBUTION COURSE TO THE PROFESSIONAL	E	Learn to recogniz	e and use of]	Renewab	le Energi	es and their t	technologies	
	Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)Identify, formulate, and solve field related problemsDesign and conduct experiments as well as to analyze and interpret dataInterdisciplinary knowledge association and application							
MAIN TEXTBOO)K							
SUPPORTING R	EFERENCES	HINDRICHS; Roger A.;(1996) Energy Its Use AndEnviroment. GOSWAMI, D.Yog1 and KREITH, Frank, KREIDER, Jan, F; (2000) Principles of Solar Engineering, Taylor and Francis.						
NECESSARY CO MATERIALS	URSE							

COURSE SCHEDULE

	COURSE SCHEDULE					
WEEK	SUBJECTS					
1	Fosil and Renewable Energy,					
2	Energy and Population,					
3	Geenhouse Effect and Environment					
4	Solar spectrum					
5	Midterm exam 1					
6	Solar termal energy					
7	Solar termal energy					
8	Solar cells,					
9	Solar cells, Hyrdogen					
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)

	(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.		Χ			
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.		Χ			



COURSE CODE: 121317561

COURSE NAME: MICRO PROCESSORS

SEMESTER		URSE HOURS PER COURSE						
	Theory	Tutorial	Credit	E	ECTS TYPE			
7	3	0	3		5	COMPUL	SORY () ELECTIV	E (x)
Please depict	the credit (for non-cre		of course hour f necessary).	rs per wee	k)of the	course below	w (please shar	e the
Mathematics	and Basic Sciences	Physics Subjects the course						1
MEASUDING	3			ODIAI				
ACTIVITIES	AND EVALUATION		L AND TUT URSES	URIAL	Ι	ABORATO	ORY COURS	ES
		Activity type	Number	%		ity type	Number	%
		Midterm Exam	2	20		erm Exam		
MIDTERM		Quiz			Perfo	rimenting rmance		
		Homework			Repor			
		Project				Exam or		
		Others()			Quiz	()		
FINAL EXAM		Other ()	1	60	Other	()		
	AM (Oral/Written)	Written	1	00				
PREREQUISI	· · · · · · · · · · · · · · · · · · ·	-						
	RSE CONTENT	Introduction to Software and ha programmes and	ardware structor stru	cture, Mi of the 808	nimum 85 CPU	microproce	ssor config	uration,
OBJECTIVES	OF THE COURSE	The main object Microprocessors.	t of the co	ourse is	to pro	vide a bas	ic understand	ding of
CONTRIBUTI COURSE TO T PROFESSION								
Image: International Final Active 1. Understand Microprocessors. LEARNING OUTCOMES OF THE COURSE 1. Understand Microprocessors. 2. 8080/8085/8088 and 80286/80386 microprocessors learning 3. Learning the internal structure of microprocessors 4. Microprocessor applications.								
MAIN TEXTB	OOK							
SUPPORTING	REFERENCES	 Boylesta theory, N Nashelsl 	2. Boylestad, R. & Nashelsky, L. (1978). Electronic devices and circuit theory, New- Jersey, Prentice-Hall Inc.					rcuit
NECESSARY MATERIALS	COURSE							

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 Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and 1 x experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 x individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew х oneself continuously. 9 Ethical and professional responsibility. х Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, 10 Х entrepreneurship. The knowledge about the effects of physics practices socially and globally which 11 are related to health, environment and security; awareness about the legal results Х 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. X

SEMESTER	NUMBER OF CO PER W				COURSE				
	Theory	Tutorial	Credit	E	СТЅ	ТҮРЕ	PE		
7	3	0	3		5	COMPULSORY () ELECTIVE ()			
Please depict th	e credit (for non-credi		course hour necessary).	s per wee	ek)of th	e course belo	ow (please sha	are the	
Mathematics	and Basic Sciences	Physics Subjects if the course	s [Please dep			eneral ucation	Social		
	3	THEODETICAL							
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAL COU	AND TUIX IRSES	JKIAL	L	ABORATO	RY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
MIDTERM		Midterm Exam Quiz	2	20	Exper	rm Exam imenting rmance			
WIDTERW		Homework Project			Repor Oral I Quiz	ting Exam or			
		Other ()				()			
FINAL EXAM			1	60					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	Γ(S) IF ANY	-							
	RSE CONTENT OF THE COURSE	 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. To introduce high energy and particle physics. It is also aimed to introduce micro constituents of matter and fundamental interactions. 							
CONTRIBUTI COURSE TO 7 PROFESSION		Students will lear the micro univers	rn elementar				tion mechani	sms in	
	UTCOMES OF	 Learn knowledge about micro constituents of matter. Realize the fundamental forces and their interactions. Apply knowledge of natural sciences (Mathematics, Physics). Justify and analyze natural phenomena. Identify, formulate, and solve field related problems. Design and conduct experiments as well as to analyze and interpret data. Use new technology and modern techniques such as computer and computer software to analyze and model the scientific problems. Interdisciplinary knowledge association and application. Direct correlation and application of gained knowledge with technology and industry. Get an understanding of professional and ethical responsibility. Get recognition of the need for, and an ability to engage in life-long learning. Gain knowledge of contemporary issues. 					and s.		
MAIN TEXTB	OOK	Griffiths, D. "Intr 2008.					Vch, Weinhe	im,	
SUPPORTING	REFERENCES	Wesley, 2. Frauenfe New Jers	MA, 1982.	ley, E. M	I., "Sub	atomic phys		Hall,	

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

	New York, 1992.			
NECESSAI MATERIA	RY COURSE LS			
	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 accerelators			
13	Applications of the particle accelerators			
14	Notrino 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)

NG				_		
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				

COURSE CODE: 121317563

COURSE NAME: X-RAYS AND APPLICATIONS

SEMESTER		OURSE HOURS WEEK			COURSE		
	Theory	Tutorial	Credit	E	СТЅ	ТҮРЕ	
7	3	0	3		5 СОМРИ	JLSORY () ELECTIV	E (X)
Please depict	the credit (for non-cr	edit courses, number credits	of course hou if necessary).		ek)of the course be	low (please sha	re the
Mathematics	and Basic Sciences	Physics Subject the course		ict (√) if	General Education		
	3		()				
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICA CO	L AND TUT(URSES	ORIAL	LABORAT	ORY COURS	ES
		Activity type	Number	%	Activity type	Number	%
		Midterm Exam	2	25	Midterm Exam		
		Quiz			Experimenting		
MIDTERM					Performance		
		Homework			Reporting		
		Project			Oral Exam or		
		Others()			Quiz		
FINAL EXAM	ſ	Other ()	1	50	Other ()		
	AM (Oral/Written)	Written	1	30			
PREREQUISI	(WIIttell					
OBJECTIVES CONTRIBUTI COURSE TO PROFESSION	THE AL TRAINING UTCOMES OF	of x-rays, Proper atoms, Miller Ind and protection Properties and pro To use of x-rays in Apply knowledge Identify, formulat Design and condu Interdisciplinary In Direct correlation industry	ties of x-rays dices, Laue, I oduction of x- n and plasma of natural sci- te, and solve f ict experiment knowledge ass and applicati of the need for	, x-ray so Powder an rays manufac dences (Ma ield relate ts as well sociation a on of gair or, and an	athematics, Physica d problems as to analyze and i and application led knowledge with ability to engage in	ction by electr methods, X-ra s, Chemistry) nterpret data n technology an	ons and y safety
MAIN TEXTB	OOK						
SUPPORTING	REFERENCES	REFERENCES Culllity, B.D. and X-Ray Diffract A.B.D. Culllity, B.D., (197 Addison-Wesle Suryanarayanaan Plenum Press, I Klung, P. Harold	ion, Pearson Pr 8) Elements of y. d ,C. And Nort New York.	entice Hall X-Ray Di ton M. Gra	, New Jersey, ffraction,	raction	
NECESSARY MATERIALS	COURSE	intering, i i interiora,	<u>u mezanu</u> t	., Loroy E			

	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						

REL	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.		Χ				
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.		Χ				



COURSE CODE: 121317564

COURSE NAME: ANALOG ELECTRONICS

SEMESTER	NUMBER OF COURSE HOURS PER WEEK		COURSE				
	Theory	Tutorial	Credit	ECTS	ТҮРЕ		
7	3	0	3	5	ZORUNLU () SEÇMELİ (x)		
Please depict th	e credit (for non-creo	lit courses, number of credits if	course hours pe necessary).	er week)of th	e course bel	ow (please share the	
Mathematics	and Basic Sciences		Physics Subjects [Please depict ($$)		eneral	Social	
			include design ficantly]	EC	lucation		
	3		0				

MEASURIN EVALUAT	NG AND ION ACTIVITIES	THEORETICAL COU	AND TUT	ORIAL	LABORATO	RY COURSI	ES
		Activity type	Number	%	Activity type	Number	%
		Midterm Exam Quiz	2	20	Midterm Exam Experimenting		
MIDTEDM		Quit			Performance		
MIDTERM		Homework			Reporting		
		Project			Oral Exam or		
		O(1 ())			Quiz		
FINAL EXA	AM	Other ()	1	60	Other ()		
	EXAM (Oral/Written)	Written	1	00			
	ISIT(S) IF ANY	-					
_	DURSE CONTENT	pressure, flow, physics.	sound and	heat sen	transistors and op sors and their gene	eral application	ons in
	ES OF THE COURSE	The main object of Electronics.	of the course	e is to pro	ovide a basic under	standing of A	Analog
COURSE T	JTION OF THE O THE ONAL TRAINING						
		By the end of this	module stud	dents will	be able to:		
LEARNING THE COUR	G OUTCOMES OF RSE	 Ability to analyze analog electronic circuits. Ability to design analog electronic circuits. Analog Electronic applications. Associate the gained knowledge, analyze and interpret data. Correlate and apply gained knowledge directly with technology and industry. 					
MAIN TEX	TBOOK						
SUPPORTI	NG REFERENCES	Design fr Universi 2. Robert I circuit th 3. Millman New Yor 4. Hamilto Design fr Universi 5. Robert I	or Engineers ty Press Boylestad, I leory. New J h, J.& Halki rk; Mc Graw n, S. (2003) or Engineers ty Press	s and Scie Nashelsk ersey; Pro as, C.C. 7 - Hill . Analog s and Scie Nashelsk	(1967). Electronic d g Electronics Compa entists. New York; (y, L. (1978). Elect	Cambridge ronic devices evices and cir mion : Basic (Cambridge	and reuits. Circuit
NECESSAR MATERIAL	RY COURSE LS						
		COURSE	SCHEDUI	LE			
WEEK	SUBJECTS						
1	Semiconductor material	s					
2	Diyotes						
3	Diyot applications						
4	Transistors						
5	Midterm Exam 1						
	Transistor applications						
6	Operational amplifiers (opamps)						
6 7	Operational amplifiers (opamps)					
7	1	opamps)					
7 8	Operational amplifiers (Opamp applications Pressure sensors	opamps)					
7	Opamp applications	opamps)					

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

REL	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			

COURSE CODE: 121317565

COURSE NAME: ATOMIC AND MOLECULAR PHYSICS

SEMESTER		JRSE HOURS PER EK			COURSE				
	Theory	Tutorial	Credi	t E	CTS		ТҮРЕ		
7	4	0	4		7	COMPULSORY (X) ELECT			
Please depict	the credit (for non-cree		course ho		ek)of th	e course belo	ow (please s	hare the	
Mathematic	es and Basic Sciences	Physics Subjects if the course	[Please d	epict (√)		General lucation	Social		
	3		()						
MEASURING EVALUATIO	G AND DN ACTIVITIES	THEORETICAL COU	AND TUT RSES	ORIAL	L	ABORATO	RY COUR	SES	
		Activity type	Number	%		vity type	Number	%	
		Midterm Exam Quiz	2	25	Expe	erm Exam rimenting rmance			
MIDTERM		Homework			Repo				
		Project			Oral I Quiz	Exam or			
		Other ()			Other	:()			
FINAL EXA			1	50					
MAKE UP E	XAM (Oral/Written)	Written							
PREREQUIS	SIT(S) IF ANY	-							
SHORT COL	JRSE CONTENT	Obtaining eigenfu atoms, investigation	on of intera	iction mec	hanism	s in two-part	icle atoms	-	
OBJECTIVE	S OF THE COURSE	atom theory		•					
	FION OF THE	Associate the students' gained physical knowledge by investigation of							
COURSE TO) THE NAL TRAINING	phenomena taking place at atomic level							
	OUTCOMES OF	Application of qua	antum mec	hanical kr	owledg	e manifestat	tion of diffe	rence	
THE COURS		between quantum						ence	
MAIN TEXT			Atom ve Molekül Fiziği, Prof.Dr. Erol Aygün ve Prof.Dr. Mehmet Zengin, Bilim Yayıncılık, Ankara, 2005						
SUPPORTIN	G 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, 20 Atom ve Molekül Fiziği Problemleri ve Çözümleri, Prof.Dr. Mehmet Zeng Doç.Dr. Ali Yaman ve Dr. R. Gökhan Türeci, Bilim Yayıncılık, Ankara, 20						n 1, 2003 Zengin,	
NECESSARY MATERIAL									

	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					
	about physics and related areas.						

	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.				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.		Χ			
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.		Χ			

COURSE CODE: 121317566

COURSE NAME: SOLID STATE PHYSICS

SEMESTER						COURSE						
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ					
7	4	0	4		7 COMPULSORY (x) ELEC			Έ()				
Please depict the	e credit (for non-cree	dit courses, number of credits if	course hour necessary).	s per we	ek)of th	e course belo	ow (please sh	are the				
Mathematics	and Basic Sciences	if the course	Physics Subjects [Please dep if the course include desi significantly]		General Education		Socia	l				
	4		()									
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAL COU	AND TUTC RSES	JRIAL	L	ABORATO	RY COURS	ES				
		Activity type	Number	%	Activ	ity type	Number	%				
		Midterm Exam	2	25	Midterm Exam							
		Quiz				rimenting						
MIDTERM						rmance						
		Homework			Repor							
		Project				Exam or						
		Other (Quiz Other ()							
FINAL EXAM		Other ()	1	50	Other	()						
	AM (Oral/Written)	Written	1	50	<u> </u>			1				
	(-										
PREREQUISI	Γ(S) IF ANY											
SHORT COUF	RSE CONTENT	Crystal structure binding, Phonon electron Fermi Ga	s I: Crystal v					Crystal s, Free				
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.										
CONTRIBUTI		1. To teach the ro	1. To teach the role of physical properties of solids in technological									
COURSE TO T		applications.										
PROFESSION	AL TRAINING	2. To provide a better understanding of electronic and material sciences.										
		materials	7. Knows the basic concepts and crystalline structures of solid materials.									
	UTCOMES OF	8. Knows the crystal structure analysis of solids.										
THE COURSE		10. Knows th	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 TEXTB	OOK	Katıhal Fiziğine G	Giriș (KITTE	L), çevir	i: B. Ka	araoğlu, ART	TE-Bilgi Tk, 1	1996.				
		1. Katıhal I	Fiziğine Giriş	ș, Prof.D	r. Tahsi	n Nuri Durlu	ı, AÜ					
SUPPORTING	REFERENCES	Altunbaş	Fiziği, J.R. HOOK & H.E. Hall, çeviri: F. Köksal, M. ış, M. Dinçer. tary Solid State Physics, M. Ali Omar, 1993.									
NECESSARY MATERIALS	COURSE											

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)

	$(5. \operatorname{very}\operatorname{High}, 4. \operatorname{High}, 5. \operatorname{Widdle}, 2. \operatorname{Low}, 1. \operatorname{very}\operatorname{Iow})$	r	r	r		
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			



SEMESTER	NUMBER OF CO PER V		COURSE NAME: NUCLEAR PHYSICS COURSE							
	Theory	Tutorial	Credit	E	стя	TYPE				
7	4	0	4		7 COME	ULSORY () ELECTIVI	Ξ (x)			
Please depict t	he credit (for non-cre		of course hou if necessary)		eek) of the cours	e below (please	share			
Mathematics	and Basic Sciences	Physics Subjects if the course	ıbjects [Please depict (√) Gener		General Education	Social	1			
	3		()							
MEASURING EVALUATION		THEORETICAL COU	AND TUT(RSES	ORIAL	LABORA	ORY COURS	ES			
		Activity type	Number	%	Activity type	Number	%			
		Midterm Exam Quiz	2	20	Midterm Exam					
	MIDTERM				Experimenting					
MIDTERM					Performance Reporting					
		Homework Project			Oral Exam or					
		110,000			Quiz					
		Other ()			Other ()					
FINAL EXAM			1	60						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	Г(S) IF ANY	Electromagnetic 7	Theory I & II	l, Quantu	m Physics I & II					
SHORT COUR	RSE CONTENT	Nuclear terminolo nuclear fission, re		of nuclea	r science, nuclear	reactions,				
OBJECTIVES	OF THE COURSE	Understanding the their applications	e radioactivit			ssion, and study	ing			
CONTRIBUTI		We aimed at intro	ducing stude	ents to pr	ofessions which					
COURSE TO		the nuclear physic			application area	s of nuclear phys	sics			
	AL TRAINING	and organizing set			1:-4: 1-: 1					
LEARNING O THE COURSE	UTCOMES OF	Learn radiation, b works.	-		_					
MAIN TEXTB	OOK		Hore-Lacy, Ian. Nuclear Energy in the 21st Century. 7th. London: World Nuclear Press, 2006.							
SUPPORTING	REFERENCES	J. K. Shultis and I	cs I and II" K. S. Krane, 1988, John Wiley & Sons, Inc. d R. E. Faw, Fundamentals of Nuclear Science and nd ed., CRC Press, 2008.							
NECESSARY MATERIALS	COURSE	Nuclear Physics F								

	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.	Χ					
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.	Χ					

COURSE COD			JRSE NAMI	E: Coloi	R AND L	ight Filter	S		
SEMESTER	NUMBER OF COUL WEI				CO	DURSE			
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ		
7	0	6	3		8	COMPULS	SORY() ELECTIVI	E (X)	
Please depict	the credit (for non-cred		f course hour f necessary).	rs per wee	k)of the	course below	v (please shar	e the	
Mathematics	and Basic Sciences	Physics Subjects	s [Please dep			eneral	Socia	1	
			include desi ificantly]	gn	Ea	ucation			
	3		()						
MEASURING ACTIVITIES	AND EVALUATION	THEORETICAL CO	L AND TUT URSES	ORIAL	I	LABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam Quiz	1	25	Exper	erm Exam rimenting rmance			
MIDTERM		Homework	1	25	Repor				
		Project			Oral Exam or				
					Quiz				
		Other ()	1	50	Other	·()			
FINAL EXAM	AM (Oral/Written)	Written	1	50	+				
PREREQUISIT		-							
SHORT COUR	RSE 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.							
CONTRIBUTI		Design and conduct experiments as well as to analyze and interpret data.							
COURSE TO T PROFESSION	THE AL TRAINING	Direct correlation and application of gained knowledge with technology and industry. Interdisciplinary knowledge association and application.							
	UTCOMES OF THE	Learning concepts of light and color. Learning light models and color diagrams. Learn color models and dispersion techniques of white light.							
MAIN TEXTB	ООК	Ghatak,A., (1987), Optics, Tata McGraw-Hill Publishing Co.Ltd.,New Delhi							
SUPPORTING	REFERENCES		şık filtreleri v	k, (Çev:Armağan,N.), Akademi yayını,İSTANBUL releri ve filtrelerden geçen ışığın özellikleri, Yüksek					
NECESSARY MATERIALS	COURSE								

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					

RF	LATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES OUTCOMES		THE	PRO	GRA	M
	(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.			Χ		
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.			Χ		

ESOGU Physics Department Course Information Form COURSE CODE: 121317569 COURSE NAME: PLASMA TECHNIQUES

C

SEMESTER		COURSE HOURS WEEK			C	OURSE			
	Theory	Tutorial	Credit	Credit ECTS			ТҮРЕ		
7	0	6	3		8 COMPULSORY () EL			Y() ELECTIVE(x)	
Please depict th	e credit (for non-cre	dit courses, number of credits if	course hour necessary).	s per we	ek)of th	e course belo	ow (please sha	are the	
Mathematics	and Basic Sciences	if the course			-	eneral lucation	Social	l	
	3	THEODETICAL							
MEASURING EVALUATION	AND N ACTIVITIES	THEORETICAL COU	AND TUTC RSES	JRIAL	L	ABORATO	RY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam	2	25		erm Exam			
		Quiz			Exper	rimenting rmance			
MIDTERM		Homework			Repor				
		Project				Exam or			
		Other (Internship)			Other	·()			
FINAL EXAM	[1	50					
MAKE UP EX	AM (Oral/Written) Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUR	RSE CONTENT	Thin-film deposit facilities, evaluati	on of the res	ults of th	e studie				
OBJECTIVES	OF THE COURS	E Comprehend the	basics of plas	sma tech	niques.				
CONTRIBUTI		The Importance of Plasma Applica					ics. The Impo	ortance	
	UTCOMES OF	Learning the tech the resulting mov					nt materials, ı	uses of	
MAIN TEXTB		Ekem, N. Musa, O			0,	5	ıre Notes, Esk	isehir.	
SUPPORTING	G 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 						s And Gases,	
NECESSARY MATERIALS	COURSE	Plasma Physics an					7		

	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 (Moleculer beam Epitaxy, MBE)
15,16	Final Exam

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (5: Very high 4: High 2: Middle 2: Low 1: Very low)

	(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.	Χ				
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

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SEMESTER	NUMBER OF COU WE				С	OURSE			
	Theory	Tutorial	Credi	t	ECTS	ТҮРЕ			
						COMPULS	ULSORY() ELECT		
7	0	6	3		8		(x)		
Please depict	the credit (for non-crea		course ho		eek)of tl	e course belo	ow (please sl	hare the	
Mathematic	es and Basic Sciences	Physics Subjects if the course	[Please d	epict (√)		General lucation	Social		
	3		()						
MEASURIN EVALUATIO	G AND DN ACTIVITIES	THEORETICAL COU	AND TUT RSES	FORIAL	' L	ABORATO	RY COURS	SES	
		Activity type	Number	%	Activ	vity type	Number	%	
		Midterm Exam	2	25		erm Exam			
		Quiz				rimenting			
MIDTERM					Perfo	rmance			
MID I ERM		Homework			Repo				
		Project				Exam or			
					Quiz				
		Other ()			Other	r ()			
FINAL EXA			1	50					
MAKE UP E	XAM (Oral/Written)	Written							
PREREQUIS	SIT(S) IF ANY	-							
SHORT COU	JRSE CONTENT	History of Super- electrical conduct							
OBJECTIVE	S OF THE COURSE	To give basic info	rmation ab	out supe	rconduct	ors.			
COURSE TO	FION OF THE) THE NAL TRAINING		analyse natural sciences, relate and apply the knowledge in an ry concept and follow contemporary professional subjects.						
	OUTCOMES OF	To follow the inve	e investigations on superconductors.						
MAIN TEXT	BOOK	Poole, C. H., Proz	ozorov, R., (2007). Superconductivity.						
SUPPORTIN	G REFERENCES	Serway, R. A., (19 Kittel, C., (1996). Burns, G., (1992).	Katıhal Fi	ziğine G	iriş (Trar	islated)	Cilt		
NECESSARY MATERIAL		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

RF	CLATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES	AND	THE	PRO	GRA	Μ
	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.			Х		

ESOGU Physics Department Course Information Form COURSE CODE: 121317571 COURSE NAME: LIQUID STATE PHYSICS

	URSE CODE: 121	317571		COURS	E NAM	E: LIQUID	STATE PHYSI	CS	
SEMESTER		COURSE HOURS WEEK	COURSE						
	Theory	Tutorial	Credit	Ε	СТЅ		ТҮРЕ		
7	0	6	3		8	COMPULS	SORY () ELECTIV	E (x)	
Please depict the	e credit (for non-cre	dit courses, number of	f course hour f necessary).	s per we	ek)of th	e course belo	ow (please sh	are the	
Mathematics	and Basic Sciences	Physics Subject if the course	s [Please dej			eneral ucation	Social		
	3		0						
MEASURING EVALUATION		THEORETICAL COU	AND TUT	ORIAL	L	ABORATO	RY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam	2	25		rm Exam			
		Quiz			Exper	imenting			
						rmance			
MIDTERM		Homework			Repor				
		Project			Oral I Ouiz	Exam or			
		Other				()			
		(Internship)							
FINAL EXAM		•	1	50					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	Г(S) IF ANY	-							
SHORT COUF	RSE CONTENT	Description of the Structure of the I States, Theories f Ray, Neutron an binary Non-Crys Models, partial S Liquid metals, Di	Liquid and A fort he Struct d Electron I stalline syst structures, Li	Amorpho ure of No Diffaction em, Pur quid Ser	us State on-Crys n, Separ re Meta nicondu	es with the (talline Mater ration of Pa- als, Binary ctors, Distru-	Crystal and g rials, Analysis rtial Structure Alloys, Stru	aseous s of X- es in a uctural	
OBJECTIVES	OF THE COURSI	Crystal structural	l analysis of	nonline	ar syste	ems, analysi			
CONTRIBUTI COURSE TO 7 PROFESSION		Importance of Liquid Physics theory and applications in the field of inc and technology						ndustry	
	UTCOMES OF	Studies of Liquid metal and alloys structures, comment of Non-Crystall materials structure analysis.					stalline		
MAIN TEXTB	OOK	The Structure of 1980, New York.		line Mate	erials, Y	oshio WAS	EDA McGrav	w-Hill,	
SUPPORTING	REFERENCES	Introduction to th University 1972 I		Liquid M	letals, T	.E. FABER,	Cambridge		
NECESSARY MATERIALS	COURSE	-							

	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 fort he Structure of Non-Crystalline Materials
4	Analysis of X-Ray, Neutron and Electron Diffaction
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	Distrubution fonctions of Liquid metals
14	Distrubution fonctions of Liquid Alloys
15,16	Final Exam

RF	CLATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low		THE	PRO	GRA	М
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.	Χ				
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.		Χ			

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

SEMESTER		COURSE HOURS R WEEK	COURSE					
	Theory	Tutorial	Credit	E	CTS	ТҮРЕ		
7	0	6	3		8	COMPUL	SORY () ELECTIVE	E (x)
Please depict the	credit (for non-c	redit courses, number credits	of course hou if necessary).		ek)of the	course belo	ow (please sha	re the
Mathematics and	d Basic Sciences	Physics Subjects	s [Please depi	ict (√) if		eneral	Socia	l
			include desig	gn	Edu	ication		
3	3	sign	ificantly]					
MEASURING AN		THEORETICAL	L AND TUT	ORIAL				EC
EVALUATION A	CTIVITIES		URSES				DRY COURS	
		Activity type	Number	%		ty type	Number	%
		Midterm Exam	2	25		m Exam	_	
		Quiz			Experi Perform	menting		
MIDTERM		Homework			Report		+	
		Project				xam or	1	
					Quiz			
		Other ()			Other	()		
FINAL EXAM			1	50				
MAKE UP EXAN	1 (Oral/Written)	Written						
PREREQUISIT(S	5) IF ANY	-						
		Crystal Structure	Intrinsic and	Extrinsic	Semicor	ductors Fi	negy Bands H	Ioles
		Crystal Structure, Semiconductors, Electrical Proper Junction, Metal-S Semiconductor th	Defect Leve ties of Semi emiconductor	els in Se iconductor Contacts	emicond s, pn J ,Metal-	uctors, Op unction St Semiconduc	tical Properti ructures Bias ctor Ohmic C	es an of p
OBJECTIVES OI CONTRIBUTION COURSE TO TH	F THE COURSI N OF THE E	Semiconductors, Electrical Proper Junction, Metal-S	Defect Leve ties of Semi emiconductor in films to exa	els in Se iconductor <u>Contacts</u> amine som	emicond rs, pn J ,Metal- ne of the	uctors, Op unction St Semiconduc feature as a	tical Properti ructures Bias ctor Ohmic Co theoretical	es ar of p
OBJECTIVES OI CONTRIBUTION COURSE TO TH PROFESSIONAL	F THE COURSI N OF THE E L TRAINING	Semiconductors, Electrical Proper Junction, Metal-S Semiconductor th	Defect Leve ties of Semi emiconductor in films to exa ation about the of natural sci e, and solve f ict experiment change ass and applicati of the need for	els in Se iconductor Contacts amine son e productio iences (Ma ield related ts as well a sociation a on of gain or, and an	a ,Metal-3 ,Metal-3 ,Metal-3 a , Metal-3 a , Metal	uctors, Op unction St Semiconduc feature as a niconductor cs, Physics, ns lyze and int cation ledge with	tical Properti ructures Bias ctor Ohmic Co theoretical thin films Chemistry) terpret data technology an	d
SHORT COURSE OBJECTIVES OF CONTRIBUTION COURSE TO TH PROFESSIONAL LEARNING OUT THE COURSE	F THE COURSI N OF THE E L TRAINING	Semiconductors, Electrical Proper Junction, Metal-S Semiconductor th To obtain informa Apply knowledge Identify, formulat Design and condu Interdisciplinary H Direct correlation industry Get a recognition	Defect Leve ties of Semi emiconductor in films to exa ation about the of natural sci e, and solve f ict experiment change ass and applicati of the need for	els in Se iconductor Contacts amine son e productio iences (Ma ield related ts as well a sociation a on of gain or, and an	a ,Metal-3 ,Metal-3 ,Metal-3 a , Metal-3 a , Metal	uctors, Op unction St Semiconduc feature as a niconductor cs, Physics, ns lyze and int cation ledge with	tical Properti ructures Bias ctor Ohmic Co theoretical thin films Chemistry) terpret data technology an	d
OBJECTIVES OI CONTRIBUTION COURSE TO TH PROFESSIONAL LEARNING OUT THE COURSE	F THE COURSI N OF THE E TRAINING	Semiconductors, Electrical Proper Junction, Metal-S Semiconductor th To obtain informa Apply knowledge Identify, formulat Design and condu Interdisciplinary H Direct correlation industry Get a recognition	Defect Leve ties of Semi- emiconductor in films to exa- ation about the of natural sci e, and solve f act experiment knowledge ass and applicati of the need for e of contempo 995) Semicor ies hn P.;(1966) ional Edition	els in Se iconductor Contacts amine som e production iences (Ma ield related tield related ts as well a sociation a on of gain or, and an rary issues	emicondu rs, pn J , Metal-3 ne of the on of ser athematic d problem as to ana and appli ed know ability to s	uctors, Op unction St Semiconduc feature as a niconductor cs, Physics, ns lyze and int cation ledge with engage in onics, Physi	tical Properti ructures Bias ctor Ohmic Co theoretical thin films Chemistry) terpret data technology an life-long learn cs and Techno or Physics,	d ing
OBJECTIVES OI CONTRIBUTION COURSE TO TH PROFESSIONAL LEARNING OUT THE COURSE MAIN TEXTBOO	F THE COURSI N OF THE E TRAINING COMES OF DK EFERENCES	Semiconductors, Electrical Proper Junction, Metal-S Semiconductor th To obtain informa Apply knowledge Identify, formulat Design and condu Interdisciplinary H Direct correlation industry Get a recognition Gain a knowledge REFERENCES Jasprit, Singh;(1 McGraw-Hill Ser McKELVEY, Jo A Harper Internat SZE, S.M.; (1981 TYAGI, M.S.; (In	Defect Leve ties of Semi- emiconductor in films to exa- ation about the of natural sci e, and solve f act experiment knowledge ass and applicati of the need for e of contempo 995) Semicor ies hn P.;(1966) ional Edition	els in Se iconductor Contacts amine som e production iences (Ma ield related tield related ts as well a sociation a on of gain or, and an rary issues	emicondu rs, pn J , Metal-3 ne of the on of ser athematic d problem as to ana and appli ed know ability to s	uctors, Op unction St Semiconduc feature as a niconductor cs, Physics, ns lyze and int cation ledge with engage in onics, Physi	tical Properti ructures Bias ctor Ohmic Co theoretical thin films Chemistry) terpret data technology an life-long learn cs and Techno or Physics,	d d blogy,

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	Enegy 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.		Χ						
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.		Χ						

COURSE CODE: 121317573

COURSE NAME: ELECTRONIC CIRCUIT DESIGN

SEMESTER		J <mark>RSE HOURS PER</mark> ZEK	COURSE							
	Theory	Tutorial	Credit		ECTS	ТҮРЕ				
7	0	6	3		8	COMPUI	LSORY () ELECTIV	DRY () ELECTIVE (x)		
Please depic	t the credit (for non-cr	edit courses, number o credits	of course hou if necessary).		ek)of the	e course belo	w (please shar	re the		
Mathematics and Basic Sciences		Physics Subject the course		e depict (√) if e design		eneral lucation	Social			
	3		0	0.000.00						
MEASURING AND EVALUATION ACTIVITIES			THEORETICAL AND TUTORIAL COURSES			LABORATORY COURSES				
		Activity type	Number	%	Activ	ity type	Number	%		
		Midterm Exam	2	25		erm Exam				
MIDTEDM		Quiz				rimenting rmance				
MIDTERM		Homework			Repo	rting				
		Project				Exam or				
		Other ()			~	:()				
FINAL EXAM	-		1	50		×/				
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	T(S) IF ANY	-								
	RSE CONTENT	Introduction to circuit simulated programmes, Electronic Circuits with circui simulated programmes analysis (Electronic work bench)					h circuit			
OBJECTIVES	OF THE COURSE	The main objecti	The main objective of the course, the design of electronic circuits to perform the operation on computer.							
CONTRIBUTI COURSE TO 7 PROFESSION			Circuit design to make the computer environment and students to see the operation of the circuit will give a different perspective.							
LEARNING O COURSE	UTCOMES OF THI	 Understand Circuit Design. Circuit Design applications. Associate the gained knowledge, analyze and interpret data. Direct correlation and application of gained knowledge with technology and industry. Gain a knowledge of contemporary issues 								
MAIN TEXTB	OOK									
SUPPORTING	REFERENCES	 Peter H. Beards(1987), Analog and digital electronics. Jacob Millman ; Christos C. Halkias(1987), Integrated electronincs : analog and digital circuits and systems Any equivalent book 								
NECESSARY MATERIALS	COURSE									

COURSE SCHEDULE

I

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					

SEMESTER	NUMBER OF COU WE				CC	DURSE			
	Theory	Tutorial	Credit	E	ECTS TYPE				
7	0	6	3		8	8 COMPULSORY () ELECT			
Please depic	t the credit (for non-cre		f course hour f necessary).	rs per weel	k)of the	course below	v (please shar	e the	
Mathematic	s and Basic Sciences	Physics Subjects the course	Physics Subjects [Please depict (√) if the course include design significantly]			eneral ucation	Socia	l	
	3		()						
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	L	ABORATC	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam				rm Exam			
		Quiz			Exper	rimenting rmance			
MIDTERM		Homework	1	40	Repor	ting			
		Project			Oral E Quiz	Exam or			
		Other ()			Other	()			
FINAL EXAM	[1	60					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUI	RSE CONTENT	Superconductivity Polarization of I	Electrical Conduction of Dielectrics, Electrical Conduction of Metals, Superconductivity and Hyperconductivity, Surface Conduction of Dielectrics, Polarization of Dielectrics, Depeendence of Permitivity on Various Factors, Mechanical Forces in Dielectrics in an Electric Field.						
OBJECTIVES	OF THE COURSE	Properties of Diel	ectrics						
CONTRIBUTI COURSE TO 7 PROFESSION		İmportance of Die	Dielectrics						
LEARNING O COURSE	UTCOMES OF THE								
MAIN TEXTB	OOK	Physics of Dielectric Materials, B., TAREEV, Moscow, 1975.							
SUPPORTING	G REFERENCES	Physics, R.A. Serv	erway, Philadelphia, 1992.						
NECESSARY MATERIALS	COURSE								

COURSE CODE: 121317574

COURSE NAME: DIELECTRICS

	COURSE SCHEDULE					
WEEK	SUBJECTS					
1	Electrical Conduction of Dielectrics					
2	Volume Resistance of Variously 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 Permitivity 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 Having sufficient knowledge about mathematics, physics and the skill of 1 applying for modelling and solving of physics problems by the theoretical and х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 х individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew x oneself continuously. 9 Ethical and professional responsibility. X Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, 10 Х entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results 11 X 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. х

ESOGU Physics Department Course Information Form COURSE CODE: 121317575 **COURSE NAME:** MOLECULAR SPECTROSCOPY

SEMESTER		COURSE HOURS PER COURSE WEEK								
	Theory	Tutorial	Credi	t	ECTS		ТҮРЕ			
7	0	6	3	8		COMPULS	E (X)			
Please depict	the credit (for non-cr	edit courses, number o credits i	of course hou f necessary)		ek)of the	course below	w (please shar	e the		
Mathematics	and Basic Sciences		s [Please de] include des ificantly]			eneral ucation	1			
MEASURING ACTIVITIES	AND EVALUATIO		L AND TUT URSES	ORIAL	I	ABORATO	ORY COURS	ES		
		Activity type	Number	%	Activ	ity type	Number	%		
		Midterm Exam	2	10		erm Exam				
MIDTERM		Quiz			Exper Perfor	rimenting rmance				
		Homework			Repor					
		Project	1	50	Quiz	Exam or				
		Other ()			Other	()				
FINAL EXAM			1	30						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	Γ(S) IF ANY	-								
SHORT COUR	RSE CONTENT		Performed experimental studies to determine the characteristics of a compound to be selected report are prepared.							
OBJECTIVES	OF THE COURSE	The device accord be selected and th instrument, in co evaluate the abilit	ling to inves ne students the mparison w y of making	tigations horoughly ith the lit the acqui	determin erature r sition and	ned to have i esults of exp l the acquisit	information al perimental stu tion of the find	bout the udies to lings.		
CONTRIBUTI		Increasing the abi								
COURSE TO T	AL TRAINING		/ learning methods, whether a certain topic in the literature survey, the results reached by the experimental work, written and oral presentation should be							
r KUFESSION	AL INAIMING	upgraded to discu								
LEARNING O COURSE	UTCOMES OF TH	 2. Examines the lidiscusses them. 3. Uses the previor 4. Study on the ex 5. Combines the rultimate in writing 6. Orally presents 7. Poster-making 	 Understands the importance of the study area. Examines the literature regarding the study area, collects, describes and discusses them. Uses the previous information for the workspace, applies. Study on the experimental designs, makes experiments, collects data. Combines the results of studies, reviews, evaluates, discusses and offers the ultimate in writing to edit. Orally presents and defends the run. Poster-making work, exhibitions, and defends. 							
MAIN TEXTB	OOK	Stuart, B. H.,"Infr J. Wiley, 2004.								
SUPPORTING	REFERENCES	Surfaces", Oxford 2. Covering	Surfaces", Oxford University Press, 1992.							
NECESSARY MATERIALS	COURSE	Fume Hood, mag	0	precision	scales, ai	nd chemical i	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 Having sufficient knowledge about mathematics, physics and the skill of Х applying for modelling and solving of physics problems by the theoretical and 1 experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying Х 2 appropriate analysis and modelling method for the complex physics problems about physics and related areas. Skill of design a complex system, device or product by applying the modern Х design methods under realistic constraints and conditions according to a 3 specified objective. Skill of the effective usage of information technology, selection, development Х 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment, experimentation, collecting data, Х 5 analyzing and interpreting the results for the investigation of problems of the chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of Х 6 individual working. Skill of effective communication orally and in writing in Turkish and ability of Х 7 using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, Х 8 following the scientific and technological developments and ability of renew oneself continuously. 9 Ethical and professional responsibility. Х Knowledge about project management, risk management and change Х management and an awareness about sustainable development, innovativeness, 10 entrepreneurship. The knowledge about the effects of physics practices socially and globally which Х are related to health, environment and security; awareness about the legal results 11 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. Х

ESOGU Physics Department Course Information Form COURSE CODE: 121317576 **COURSE NAME:** INTRODUCTION OF QUANTUM ELECTRONICS

Activity type Number % Activity type Number % MIDTERM Quiz Experimenting Performance Performan	SEMESTER	NUMBER OF COUR WEE				CO	URSE			
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 (r) if the course include design is gainfeantly] General Social 3 () Iterase adaptit (r) if the course include design is gainfeantly] LABORATORY COURSES Activity type Number % Activity type Number % Activity type Number % Activity type Number % Midtern Exam 2 0 Midtern Exam Performance Quiz Paretrimenting Performance Performance Performance Homework Reporting Quiz		Theory	Tutorial	Credit	E	CTS		TYPE		
arcredits if necessary). Mathematics and Basic Sciences Physics Subjects [Please depict (v) if the course include design significantly] General Education Social 3 () Ithe course include design significantly] ItaBORATORY COURSES LABORATORY COURSES ACTIVITIES () ItaBORATORY COURSES ItaBORATORY COURSES MIDTERM Activity type Number % Activity type Number % MIDTERM Quiz Performance Performance Performance Performance Homework Reporting Performance Quiz Other () Quiz Deformance FINAL EXAM 0 1 60 Other () Quiz Performance PREREQUISIT(S) IF ANY - - Quantum Electronics, Annon 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 mode the scientifie problems OBJECTIVES OF THE COURSE The main aim of the course is Learning of Quantum Electronics concepts, Quantum Electronics, Annon Yariv, John Viley, New York, 1989, Apply knowledge of natural	7	0	6	3		8	COMPULS	SORY() ELECTIV	E (X)	
ithe course include design Education 3 () MEASURING AND EVALUATION THEORETICAL AND TUTORIAL COURSES LABORATORY COURSES ACTIVITIES Activity type Number % MIDTERM Quiz Experimenting Performance % Homework Reporting Experimenting Performance % MIDTERM Other () 1 0 Other () MAKE UP EXAM (Oral/Written) Written Viriten Written M MAKE UP EXAM (Oral/Written) Written 1 00 Other () 1 00 SHORT COURSE CONTENT the main aim of the course is Learning of Quantum Electronics concepts, Quantum Electronics, Annon 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 moder techniques such as computer and computer software to analyze and mode the scientific problems OBJECTIVES OF THE COURSE The main aim of the course is Learning of Quantum Electronics concepts, Quantum Electronics, Annon Yariv, John Viley, New York, 1989, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry). Justify an analyze natural phenomena, Identify,	Please depict	t the credit (for non-cred			s per wee	k)of the	course belov	v (please shar	e the	
MEASURING AND EVALUATION ACTIVITIES THEORETICAL AND TUTORIAL COURSES LABORATORY COURSES Activity type Number % Activity type Number % MIDTERM Activity type Number % Activity type Number % MIDTERM Activity type Number % Activity type Number % MIDTERM Activity type Number % Activity type Number % MIDTERM Activity type Number % Activity type Number % MIDTERM Activity type Number % Activity type Number % MIDTERM Final Exam Counce Other () Other () Other () Other () Other () Other () The main aim of the course is Learning of Quantum Electronics concepts, Quantum Electronics Concepts, Quantum Activity and analyze natural phenomena, Identity, formulate, and solve field related problems. Design and conduct experiments as well as to analyze and moder techniques such as computer and computer software to analyze and moder techniques such as computer and computer software to analyze and modet the scientific problems Activity ana	Mathematics		the course	include desig	ict (√) if gn			Socia	ocial	
ACTIVITIES COURSES LABORATORY COURSES Activity type Number % Activity type Number % MIDTERM Activity type Number % Activity type Number % Homework Performance		-		()						
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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 PROFESSIONAL TRAINING Image: Course of the cours	OBJECTIVES	OF THE COURSE	Quantum Electro knowledge of na analyze natural pl Design and con Interdisciplinary I modern technique	nics, Amnon tural sciences henomena, Ide duct experim knowledge asses s such as com	n Yariv, s (Mather entify, for ients as sociation	John V matics, I rmulate, well as and appl	iley, New Physics, Cho and solve fi to analyze lication, Use	York, 1989., emistry), Jus- eld related pre- and interpre- new technol	, Apply tify and roblems, ret data ogy and	
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SUPPORTING REFERENCES 1. Quantum Electronics, Amnon Yariv, John Viley, New York, 1989. SUPPORTING REFERENCES 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	LEARNING O COURSE	UTCOMES OF THE								
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MATERIALS COURSE SCHEDULE	SUPPORTING	REFERENCES	 Principle Laser Ele 	es of Lasers, C ectronics, Jose	Drazio Sve eph T. Ve	elto, Plen rdeyen, l	um Press, 19 Prentice Hill	989 , 1989.		
	NECESSARY MATERIALS	COURSE								
WEEK SUBJECTS			COURSE SC	HEDULE						
	WEEK SU	BJECTS								

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)

	(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			

COURSE CODE: 121317577

COURSE NAME: FIBER OPTICS

SEMESTER		JRSE HOURS PER JEK	HOURS PER COURSE						
	Theory	Tutorial	Credit	redit ECTS		ECTS TYPE			
7	0	6	3		8	COMPULSORY () ELECTIVE ()			
Please depic	t the credit (for non-cr		of course hou f necessary).	rs per wee	k)of the	course below	w (please shar	e the	
Mathematic	s and Basic Sciences	Physics Subjects the course				eneral lucation	Socia	1	
MEASUDINC	3 AND EVALUATION	N THEORETICAL	() [AND TUT	ΟΡΙΛΙ					
ACTIVITIES	AND EVALUATION		URSES	UNIAL	I	LABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam				erm Exam			
MIDTERM		Quiz				rimenting rmance			
		Homework	2	25	Repo				
		Project				Exam or			
		O(1 - ())			Quiz	·()			
FINAL EXAM	ſ	Other ()	1	50	Other	()			
	AM (Oral/Written)	Written	1	50					
PREREQUISI		-							
SHORT COUL	RSE CONTENT	Optical Fiber C Fundamental Op Configurations; F	otics Laws	and De	finitions	; Optical	Fibers Mod	Light; es and	
OBJECTIVES	OF THE COURSE	To teach basic co the fundamental n							
CONTRIBUT COURSE TO ' PROFESSION		To analyze natura groups since this				ing with diffe	erent occupat	ional	
LEARNING O COURSE	UTCOMES OF THE	E Ability to apply information that concerned with the technology.							
MAIN TEXTE	BOOK	Özsoy S., (1998), Fiber Optik, Birsen Yayınevi.							
SUPPORTING	G REFERENCES	 Powers J., (1997), An Introduction to Fiber Optic Systems, Irwin. Tomasi W, (2002), Çeviren Mustafa Atakay, Elektronik İletişim Teknikleri, MEB Yayınları. Varol H. S., Yağımlı M., (2008) Optoelektronik ve Fiber Optik, Beta Yayınevi. 							
NECESSARY MATERIALS	COURSE	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 Işınlar
14	Wave Optics
15,16	Final Exam

RF	RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM							
	OUTCOMES							
NO	(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)	5	4	2	2	1		
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						

COURSE CODE: 121317578 COURSE NAME: PRINCIPLES OF MAGNETIC RESONANCE

SEMESTER	NUMBER OF COU WE			COURSE					
	Theory	Tutorial	Credit	;]	ECTS TYPE				
7	0	6	3		8	COMPULSORY () ELECTIVE (x)			
Please depict	the credit (for non-cre		of course hour if necessary).		ek)of the	course below	w (please shar	e the	
Mathematics	and Basic Sciences	Physics Subject the course		oict (√) if	-	eneral lucation	Socia	1	
	3		()						
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	1	LABORATO	DRY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam				erm Exam			
MIDTEDM		Quiz				rimenting rmance			
MIDTERM		Homework	2	20	Repo	rting			
		Project			Oral] Quiz	Exam or			
		Other ()			Other	·()			
FINAL EXAM			1	60					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	Γ(S) IF ANY	-							
SHORT COUR	RSE CONTENT	Principles of res interaction of ele	ctrons with nu	ıclei	ole broad	dening in rig	gid lattices, M	lagnetic	
OBJECTIVES	OF THE COURSE	Principles of Res	sonance (Part	±I)					
CONTRIBUTI COURSE TO T PROFESSION									
LEARNING O COURSE	UTCOMES OF THE								
MAIN TEXTB	OOK	Principles of Mag	gnetic Resona	nce, Cha	rles P. Sl	ichter; 1984			
SUPPORTING	REFERENCES		Physics of Atoms and Molecules, B.H. Bransden, C.J. Joachain, 1999, Introduction to Solid State Physics, C. Kittel, 1996						
NECESSARY MATERIALS	COURSE								

	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

RF	RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES								
NO	(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low) 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.	3	x	5	2				
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						

COURSE CODE: 121317579 COURSE NAME: ELECTRONIC PROPERTIES OF MATERIALS

SEMESTER	NUMBER OF COU WE	COURSE						
	Theory	Tutorial	Credit E		ECTS		ТҮРЕ	
7	0	6	3		8	COMPUL	SORY() ELECTIV	/E (x)
Please depict	t the credit (for non-cre		of course hour if necessary).	rs per wee	ek)of the	course belo	w (please shai	e the
Mathematics	s and Basic Sciences	Physics Subject the course	Physics Subjects [Please depict (√) if the course include design significantly]			f General Education		l
MEASURING ACTIVITIES	3 AND EVALUATION		() L AND TUT URSES	ORIAL	1	LABORAT	ORY COURS	SES
ACHIVIILS		Activity type	Number	%	Activ	ity type	Number	%
MIDTERM		Midterm Exam Quiz			Midterm Exam Experimenting Performance			
		Homework Project	2	20	Reporting Oral Exam or Quiz			
		Other ()			Other	:()		
FINAL EXAM			1	60				
MAKE UP EX	AM (Oral/Written)	Written						
PREREQUISI	Γ(S) IF ANY	-						
SHORT COUR	RSE CONTENT	Theory of reaction Fick's law, Liquio	d-solid conve	rters, elec				law, II.
OBJECTIVES	OF THE COURSE	Electrical propert	ies of materia	ls				
CONTRIBUTI COURSE TO T PROFESSION								
LEARNING O COURSE	UTCOMES OF THE							
MAIN TEXTB	OOK	Electronic proper	ties of materia	als, Adna	n TEKİN	N, 1986		
SUPPORTING	REFERENCES	Solidstate books						
NECESSARY MATERIALS	COURSE							

	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 Having sufficient knowledge about mathematics, physics and the skill of 1 applying for modelling and solving of physics problems by the theoretical and х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 х individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew х oneself continuously. 9 Ethical and professional responsibility. Х Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, 10 Х entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results 11 х 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. х

ESOGU Physics Department Course Information Form COURSE CODE: 121317580 COURSE NAME: NANOTECHNOLOGY

COURSE CODE: 1213175	CC	DURSE	CODE:	12131758

SEMESTER	NUMBER OF COU WE		COURSE						
	Theory	Tutorial	Credit	E	ECTS		ТҮРЕ		
7	0	6	3		8	COMPUL	SORY() ELECTIV	E (X)	
Please depict	the credit (for non-cre		f course hour f necessary).	s per wee	k)of the	course below	w (please shar	e the	
Mathematics and Basic Sciences		Physics Subjects the course	Physics Subjects [Please depict (√) if the course include design significantly]) if General Education				
MEASURING ACTIVITIES	3 AND EVALUATION		L AND TUTO	ORIAL	L	ABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam			Midte	rm Exam			
		Quiz				imenting rmance			
MIDTERM		Homework	1	30	Repor	ting			
		Project	1	30	Oral E Quiz	Exam or			
		Other ()			Other	()			
FINAL EXAM			1	40					
MAKE UP EX.	AM (Oral/Written)	Written							
PREREQUISI	Γ(S) IF ANY	-							
SHORT COUR	RSE 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.							
CONTRIBUTI COURSE TO T PROFESSION		Students will learn		nomena in	nanosca	ale.			
	UTCOMES OF THE	 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 TEXTB	OOK		L. Wolf, "Nar mbH&Co. K				y", Wiley-VC	H	
SUPPORTING REFERENCES1. D.R. Vij, "Handbook of Applied Solid New York, 2006SUPPORTING REFERENCES2. Georgi Staikov, "Electrocrystallization VCH Verlag GmbH&Co. KGaA, Wei					lization	in nanotech		-	

	COURSE SCHEDULE
WEEK	SUBJECTS
1	Nanometers, Micrometers, Millimeters. Moore's LawNanometre, Mikrometre, Milimetre, Moore Yasası,

	Esaki's Quantum Tunneling Diode.
2	Mechanical Frequencies in Small Systems
3	Vibrations of a lineer 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						

COURSE CODE: 121317581 **COURSE NAME:** ACOUSTICS IN LIQUIDS NUMBER OF COURSE HOURS PER COURSE SEMESTER WEEK Tutorial ECTS Theory Credit TYPE COMPULSORY () ELECTIVE (x) 7 0 3 8 6 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 ($\sqrt{}$) if General Social Education the course include design significantly] 3 () **MEASURING AND EVALUATION** THEORETICAL AND TUTORIAL LABORATORY COURSES ACTIVITIES **COURSES** Activity type Number % Number % Activity type Midterm Exam Midterm Exam 2 20 Experimenting Quiz Performance MIDTERM Homework 20 Reporting 1 Project Oral Exam or Quiz Other (.....) Other (.....) FINAL EXAM 40 1 Written MAKE UP EXAM (Oral/Written) PREREQUISIT(S) IF ANY ultrasonic detectors and measurement techniques, relaxation theory for liquids, thermal relaxation, viscoelastic media, absorption coefficient effect of SHORT COURSE CONTENT temperature and pressure, structural relaxation, theories of sound velocity, sound velocity effect of temperature and pressure, nonlinear acoustics. By the end of this module students will be able to: 1. Learn ultrasound its chemical and physical effects. **OBJECTIVES OF THE COURSE** 2. Learn fundamental acoustics phenomena. 3. Learn ultrasonic measurement techniques. CONTRIBUTION OF THE Analyze and resolve acoustics phenomenon **COURSE TO THE PROFESSIONAL TRAINING** LEARNING OUTCOMES OF THE COURSE KINSLER L. E. (1982). Fundamentals of Acoustics New York : Johan Wily &Sons MAIN TEXTBOOK 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 Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and 1 X experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the x application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 x individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew x oneself continuously. 9 Ethical and professional responsibility. X Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, 10 x entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results 11 x 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. х



COURSE CODE: 121317582

COURSE NAME: PHOTOVOLTAIC SOLAR CELLS

SEMESTER	NUMBER OF COU WE	COURSE							
	Theory	Tutorial	Credit	E	ECTS		TYPE		
7	0	6	3		8	COMPULSORY () ELECTIVE (x)			
	t the credit (for non-cre		f course hour f necessary).	s per weel	•		_		
Mathematics and Basic Sciences		the course	Physics Subjects [Please depict (√) if the course include design significantly]		General Education		Socia	1	
MEASURING ACTIVITIES	3 AND EVALUATION		() L AND TUT URSES	ORIAL	L	ABORATO	ORY COURS	ES	
		Activity type	Number	%	Activi	ity type	Number	%	
		Midterm Exam	2	25		rm Exam			
MIDTERM		Quiz			Exper Perfor	imenting mance			
MIDIEKNI		Homework			Repor				
		Project			Quiz	Exam or			
		Other ()			Other	()			
FINAL EXAM			1	50					
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	Γ(S) IF ANY	-							
SHORT COUF	RSE CONTENT	solar cells, electr thickness of sola application areas materials for solar	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.							
CONTRIBUTI COURSE TO T PROFESSION		To teach the impo	ortance of sola	ar cells in t	technolo	gical applica	ations.		
LEARNING O	UTCOMES OF THE	 Knows the basic concepts and structure of solar cells. Knows the basic characteristics of solar cells. 							
COURSE		15. Knows the types and application areas of solar cells.16. Knows the production of solar cells and appropriate materials							
MAIN TEXTB	OOK	Harold J. Hovel, Semiconductors and semimetals, vol. 11 Solar Cells							
SUPPORTING	REFERENCES	 Physics of Peter Wü Thin Film Jef Poort 	 Physics of Solar Cells: From Basic Principles to Advanced Concepts, Peter Würfel, 2009. Thin Film Solar Cells: Fabrication, Characterization and Applications, Jef Poortmans, 2006 						
NECESSARY MATERIALS	COURSE								

	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 Having sufficient knowledge about mathematics, physics and the skill of applying for modelling and solving of physics problems by the theoretical and 1 х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the x chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 х individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew х oneself continuously. 9 Ethical and professional responsibility. х Knowledge about project management, risk management and change management and an awareness about sustainable development, innovativeness, 10 X entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results 11 х 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. х

ESOGU Physics Department Course Information Form COURSE CODE: 121317583 COURSE NAME: CLASSICAL AND QUANTUM HARMONIC OSCILLATORS

SEMESTER NUMBER OF COUR					COURSE				
	Theory	Tutorial	Credit	t E	CTS		ТҮРЕ		
7	0	6	3		8	COMPUL	SORY() ELECTIV	E (X)	
Mathematics	s and Basic Sciences		[Please deg include des ficantly]			eneral ucation	Socia	1	
MEASURING ACTIVITIES	AND EVALUATION	THEORETICAL COL	AND TUT	ORIAL	Ι	ABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam	1	30		rm Exam			
MIDTERM		Quiz			Perfo	rimenting			
		Homework	1	20	Repor				
		Project	1	30	Quiz	Exam or			
FINAL EXAM		Other ()	1	40	Other)			
	AM (Oral/Written)	Written	1	40	+			1	
PREREQUISI	, , , , , , , , , , , , , , , , , , ,	-			1				
SHORT COURSE CONTENT		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.							
CONTRIBUTI		Students will lear	n how to us	se the con	cepts of	classical ph			
COURSE TO T		of natural phen						e these	
PROFESSION	AL TRAINING								
PROFESSIONAL TRAININGphenomena fundamentally by recognizing them as classical oscillators.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 a 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 lea Gain a knowledge of contemporary issues					ter and compu a technology a	nd			
MAIN TEXTB	OOK	Bloch, S. C., "Intr Wiley & Sons Lto	roduction to	classical a		ntum harmor	nic oscillators"	', John	
SUPPORTING	REFERENCES	 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. Özemre, A.Y., "Klasik Teorik Mekanik", İstanbul Üniversitesi Fen Fakültesi Yayınları, İstanbul, 1981. 							
NECESSARY MATERIALS	COURSE		, ,						

	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							

COURSE COD		COURSE NAM	E: RADIATIO	ON AND I	RADIATIC	ON SAFET	Y METHODS			
SEMESTER	NUMBER OF COU WE		COURSE							
	Theory	Tutorial	Credit		ECTS		TYPE			
7	0	6	3		8	COMPUL	COMPULSORY () ELECTIV			
Please depict	the credit (for non-cre		f course hour f necessary).	rs per we	ek) of the	course below	w (please shar	e the		
Mathematics	and Basic Sciences		s [Please dep include desi ificantly]			General lucation	Social			
	3		()							
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	I	LABORATO	ORY COURS	ES		
		Activity type	Number	%	Activ	rity type	Number	%		
		Midterm Exam	-	-		erm Exam	-	-		
MIDTERM		Quiz	-	-	Perfo	rimenting rmance	-	-		
		Homework	1	70	Repo		-	-		
		Project	-	-	Quiz		-	-		
		Other ()	-	-	Other	:()	-	-		
FINAL EXAM			1	30		-				
MAKE UP EXA	AM (Oral/Written)	Written								
PREREQUISIT	Γ(S) IF ANY	Electromagnetic 7	Theory I & II	, Quantui	m Physics	s I & II				
SHORT COUR	SE CONTENT	Atomic structure Radiation Radioactivity and Ionizing radiation Measuring radiati	and types of			1				
OBJECTIVES	OF THE COURSE	Provide basic kno Understand possib	wledge of rad		with rad	iation				
CONTRIBUTI COURSE TO T PROFESSION		We aimed at intro nuclear physics by organizing semina	ducing stude y giving detai	nts to pro ils of app	ofessions	which are di				
	UTCOMES OF THE	With a good unde natural and manm	rstanding of	radiation	, recogniz	ze safety resp	onsibilities fo	or		
MAIN TEXTB	OOK	"Radiological Wo	orker I and II	Training	" Los Ala	amos Nationa	ll Laboratory,	1998.		
SUPPORTING	REFERENCES	"Nuclear Physics	I and II" K. S	5. Krane,	1988, Jo	hn Wiley & S	Sons, Inc.			
NECESSARY (MATERIALS	COURSE	Nuclear Physics F	Research Lab							

	COURSE SCHEDULE					
WEEK	SUBJECTS					
1	Atomic structure					
2	Radiation, radioactivity					
3	Radioactive decay law					
4	atural radioactivity, radioactive half-life					
5	fidterm 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 Having sufficient knowledge about mathematics, physics and the skill of applying for modeling and solving of physics problems by the theoretical and Х 1 experiential information about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modeling method for the complex physics problems Х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a 3 Х specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the Х application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the Х chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of Х 6 individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 Х using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew Х oneself continuously. 9 Ethical and professional responsibility. Х Knowledge about project management, risk management and change management and awareness about sustainable development, innovativeness, 10 Х entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results Х 11 of physical solutions and national and international legal regulation and the standards. 12 To have knowledge about the modern problems that is local and global. Х

COURSE CODE: 121317585

COURSE NAME: QUANTUM INFORMATION THEORY

SEMESTER		URSE HOURS PER DEK			COURSE					
	Theory	Tutorial	Credit	I	ECTS		ТҮРЕ			
7	0	6	3		8	COMPULS	E (x)			
Please depict	the credit (for non-cr	edit courses, number c credits i	of course hour f necessary).		ek)of the	course below	v (please shar	e the		
Mathematics	and Basic Sciences	Physics Subject the course	Physics Subjects [Please depict (√) if the course include design significantly]			General S Education				
MEASURING ACTIVITIES	3 AND EVALUATION		() L AND TUT URSES	ORIAL	I	LABORATO	ORY COURS	ES		
		Activity type	Number	%	Activ	ity type	Number	%		
MIDTERM		Midterm Exam Quiz	2	25	Midte Exper Perfo	erm Exam rimenting rmance				
WIDTERW		Homework Project Other ()			Quiz	rting Exam or)				
FINAL EXAM			1	50	Other	()				
	AM (Oral/Written)	Written	-	20						
PREREQUISI		-			4					
SHORT COUR	RSE CONTENT	The basic conce theory;Quantum a	lgorithms;Qu	iantum lo	gic circu	its;Applicati		ormation		
OBJECTIVES	OF THE COURSE	To teach students	the basics of	quantum	informa	tion theory.				
CONTRIBUTI COURSE TO T PROFESSION		To equip the stud Era.	ents about the	e concepts	s of futur	e computer	of quantum			
LEARNING O COURSE	UTCOMES OF THI	To teach student	To teach students to implement their original projects.							
MAIN TEXTB	OOK	Lecture notes								
SUPPORTING	REFERENCES	Computer labs								
NECESSARY MATERIALS	COURSE	Internet based sin	nulations.							

	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					

RF	RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM								
	OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low	r)							
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							

COURSE CODE: 121317586

COURSE NAME: MEDICAL IMAGING TECHNIQUES

SEMESTER	NUMBER OF COU WE									
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ			
7	0	6	3		8	COMPUL	E (X)			
Please depic	t the credit (for non-cre		f course hour f necessary).		k)of the	course below	w (please shar	e the		
Mathematic	s and Basic Sciences	Physics Subjects the course	Physics Subjects [Please depict (√) if the course include design significantly]			General Education		l		
	3		()							
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	I	LABORATO	ORY COURS	ES		
		Activity type	Number	%		ity type	Number	%		
		Midterm Exam				erm Exam				
MIDTERM		Quiz			Experimenting Performance					
		Homework	1	30	Repor					
		Project	1	40	Oral Exam or Quiz					
		Other ()			Other ()					
FINAL EXAM			1	30						
MAKE UP EX	AM (Oral/Written)	Written								
PREREQUISI	T(S) IF ANY	-								
SHORT COUR	RSE CONTENT		Types of medical imaging methods, physical fundamentals and applications of X- ay imaging, ultrasound imaging and radioactive imaging							
OBJECTIVES	OF THE COURSE	Exploration of ph				00	0	1		
CONTRIBUTI		To provide the st		v to apply	and ass	ociate their t	heoretical kn	owledge		
COURSE TO T PROFESSION	THE AL TRAINING	with medical imaging field								
LEARNING O COURSE	UTCOMES OF THE	Obtaining fundamental knowledge on medical imaging and to use this knowledge for given applications								
MAIN TEXTB	OOK	Cho, Z. H., Jone York: John Wiley		M. (1993	6). Found	dations of M	edical Imagin	g. New		
SUPPORTING	REFERENCES	Reported publicat	ions on medi	cal imagir	ng field					
NECESSARY MATERIALS	COURSE									

	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 Having sufficient knowledge about mathematics, physics and the skill of 1 applying for modelling and solving of physics problems by the theoretical and Х experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems Х about physics and related areas. Skill of design a complex system, device or product by applying the modern design methods under realistic constraints and conditions according to a Х 3 specified objective. Skill of the effective usage of information technology, selection, development Х 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the Х 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.		Χ		
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.		Χ		

ESOGU Physics Department Course Information Form COURSE CODE: 121317588 COURSE NAME: THIN FILM APPLICATIONS

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SEMESTER		URSE HOURS PER EEK	COURSE						
	Theory	Tutorial	Credit	t E	СТЅ		ТҮРЕ		
7	0	6	3		8	COMPULS	COMPULSORY () ELECT		
Please depict	the credit (for non-cre	dit courses, number of	course hou necessary).		ek)of th	e course belo	ow (please sl	nare the	
Mathematic	cs and Basic Sciences	Physics Subjects if the course	s [Please de	epict (√)				al	
MEASURIN EVALUATIO		THEORETICAL COU	AND TUT	ORIAL	L	ABORATO	RY COURS	SES	
EVALUATION ACTIVITIES		Activity type Midterm Exam	Number	%		ity type erm Exam	Number	%	
MIDTERM		Quiz			Perfo	rimenting rmance			
		Homework Project	2	25	Quiz	Exam or			
	N #	Other ()	1	50	Other	:()			
FINAL EXA	<u>M</u> XAM (Oral/Written) Written	1	50					
	SIT(S) IF ANY	-							
SHORT COU	JRSE CONTENT	Introduction to M growth mechanism spray pyrolysis te	ms, physica chnique	l vapour	depositi	on, chemica	l vapour dep	osition,	
OBJECTIVE	CS OF THE COURS	clean energy sour	ces, solar ce	ells.				r films,	
COURSE TO		To learn and apply thin film coating Technologies, to realize the semicondcutor technology and its importance, to gain experience on clean energy sources and solar cells.							
PROFESSIONAL TRAINING energy sources and solar cells. Image: Property of the system of the						-			
MAIN TEXT	BOOK	The Materials Sci		-		0			
SUPPORTIN	G REFERENCES	Handbook of Thin Methods, Equipm					ues - Princip	oles,	
NECESSARY MATERIAL		Available device Semicondcutor (materials to be stu	Characteriza						
		COURSE	SCHEDI	JLE					
		COURSE	Senebt						
WEEK	SUBJECTS								

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

Х

To have knowledge about the modern problems that are local and global.

standards.

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ESOGU Physics Department Course Information Form COURSE CODE: 121317587 COURSE NAME: Atmospheric Pressure Plasmas

SEMESTER		JRSE HOURS PER ZEK	COURSE							
	Theory	Tutorial	Credit	E	CTS		ТҮРЕ			
7	2	2	3		8	COMPUL	E (x)			
Please depict	t the credit (for non-cr		of course hour if necessary).	rs per wee	k)of the	course below	w (please shar	e the		
Mathematic	s and Basic Sciences	the course	Physics Subjects [Please depict (√) if the course include design significantly]			eneral ucation	Socia	1		
	3		()							
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	I	ABORATO	ORY COURS	ES		
		Activity type	Number	%	Activ	ity type	Number	%		
		Midterm Exam	2	25	Midte	erm Exam				
		Quiz				rimenting rmance				
MIDTERM		Homework			Repor					
		Project			Oral I	Exam or				
					Quiz					
	r	Other ()	1	50	Other	()				
FINAL EXAM		337 '	1	50						
	AM (Oral/Written)	Written								
PREREQUISI	T(S) IF ANY	-								
SHORT COUR	RSE CONTENT	temperature, Plas sheath, Plasma fi	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 un plasma paramete plasma-solid surf	rs, and is to							
CONTRIBUTI COURSE TO 7 PROFESSION		To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects								
LEARNING O COURSE	UTCOMES OF THE	Apply knowledge	Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)							
MAIN TEXTB	MAIN TEXTBOOK Ekem, N. Musa G. ve Akan T. (2001). Plazma Fiziği Ders Notları, Eskişehi						şehir.			
SUPPORTING	REFERENCES	2. Roth, J. R. (199)and Philadelphia.3. Raizer, Y. P. (199)	 Raizer, Y. P. (1991). Gas discharge physics, Springer-Verlag, USSR. Nasser, E. (1971). Fundamentals of gaseous ionization and plasma electronics, 							
whey. NECESSARY COURSE Face to face MATERIALS Face to face										

	COURSE SCHEDULE						
WEEK	SUBJECTS						
1	Describing of fourth state of matter						
2	Plasma production and plasma types						
3	lasma 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						

RF	RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM							
	OUTCOMES							
NG	(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						



COURSE CODE: 121317589

COURSE NAME: PHYSICS TOPICS ADAPTABLE TO TECHNOLOGY

SEMESTER		JRSE HOURS PER EK	COURSE						
	Theory	Tutorial	Tutorial Credit ECT		CTS				
7	0	6	3		8	COMPULSORY () ELECTIVE (x)			
Please depict	t the credit (for non-cr		of course hour if necessary).	rs per wee	k)of the	course below	w (please shar	e the	
Mathematic	s and Basic Sciences	the course	ubjects [Please depict (√) if ourse include design significantly]			General Education		1	
	3		()						
MEASURING ACTIVITIES	AND EVALUATION		L AND TUT URSES	ORIAL	I	ABORATO	ORY COURS	ES	
		Activity type	Number	%		ity type	Number	%	
		Midterm Exam Quiz	2	25	Expe	erm Exam rimenting rmance			
MIDTERM		Homework Project			Report Oral I Quiz	rting Exam or			
		Other ()				· ()			
FINAL EXAM	[50		()			
MAKE UP EX	AM (Oral/Written)	Written							
PREREQUISI	T(S) IF ANY	-							
SHORT COUR	RSE CONTENT		Vacuum and vacuum systems, DC glow discharge, Plasma source, Surface modification, Application of the Industrial Physics.						
OBJECTIVES	OF THE COURSE	Fundamentals of	plasma produ	ction syste	ems and	vacuum syst	tems.		
CONTRIBUTI COURSE TO T PROFESSION		To design of vacu	ium systems a	and plasm	a manuf	acturing syst	ems		
INCOLESSIONAL TRAINING Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)Identify, formulate, and solve field related problemsDesign and conduct experiments as well as to analyze and interpret dataInterdisciplinary knowledge association and applicationDirect correlation and application of gained knowledge with technology andindustryGet a recognition of the need for, and an ability to engage in life-long learningGain a knowledge of contemporary issues									
MAIN TEXTB	OOK								
SUPPORTING	REFERENCES	Roth,A. (1995) Company. Lieberman,M.	, Lichtenber	rg,A.L.,	Principl	es of Plasr	na Discharg	-	
			Materials Processing, New York: Wiley-Interscience PublicationMcDaniekl, 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				
NECESSA MATERI	ARY COURSE IALS				
	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.	Χ		
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		

COURSE CODE: 121318XXX

COURSE NAME: INTERSHIP

SEMESTER		URSE HOURS PER EEK	COURSE						
	Theory	Tutorial	Credit	E	ECTS		ТҮРЕ		
8	0	0	0		30	COMPULSORY () ELECTIVE			
Please depi	ct the credit (for non-cr			s per wee	k)of the	course below	w (please shar	e the	
Mathematics and Basic Sciences		Physics Subject the course	credits if necessary). Physics Subjects [Please depict (√) if the course include design significantly]		if General Education		Socia	1	
	3		()						
MEASURINO ACTIVITIES	G AND EVALUATIO		L AND TUT(URSES	ORIAL	I	ABORATO	ORY COURS	ES	
		Activity type	Number	%	Activ	ity type	Number	%	
		Midterm Exam				erm Exam			
		Quiz				rimenting rmance			
MIDTERM		Homework			Repor	rting			
					Oral I Quiz	Exam or			
		Other ()			~	()			
FINAL EXAN	Ν								
MAKE UP E	XAM (Oral/Written)								
PREREQUIS	IT(S) IF ANY								
SHORT COU	RSE CONTENT								
OBJECTIVE	S OF THE COURSE								
COURSE TO	TON OF THE THE NAL TRAINING								
	OUTCOMES OF THI	E							
MAIN TEXT	воок								
SUPPORTIN	G REFERENCES								
NECESSARY MATERIALS									
		COURSE SC	HEDULE						
WEEK SU	UBJECTS							i	
1								j	
2									

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** 4 5 3 2 1 Having sufficient knowledge about mathematics, physics and the skill of 1 applying for modelling and solving of physics problems by the theoretical and experiential informations about these areas. Skill of defining, identifying, formulating and solving by selecting and applying 2 appropriate analysis and modelling method for the complex physics problems about physics and related areas. Skill of design a complex system, device or product by applying the modern 3 design methods under realistic constraints and conditions according to a specified objective. Skill of the effective usage of information technology, selection, development 4 and usage of the modern techniques and tools which are necessary for the application of physics. An ability of designing of the experiment, experimentation, collecting data, 5 analyzing and interpreting the results for the investigation of problems of the chemical engineering. An ability of having disciplinary and interdisciplinary teamwork and ability of 6 individual working. Skill of effective communication orally and in writing in Turkish and ability of 7 using/improving the knowledge of foreign language. An awareness of the necessity of life-long learning; accessing to the information, 8 following the scientific and technological developments and ability of renew oneself continuously. 9 Ethical and professional responsibility. Knowledge about project management, risk management and change 10 management and an awareness about sustainable development, innovativeness, entrepreneurship. The knowledge about the effects of physics practices socially and globally which are related to health, environment and security; awareness about the legal results 11 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.