ELECTRICAL MATERIALS

1	Course Title:	ELECTRICAL MATERIALS	
2	Course Code:	EEM2304	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	4	
7	ECTS Credits Allocated:	3.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	-	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. GÜNEŞ YILMAZ	
15	Course Lecturers:	Yrd. Doç. Dr. Sait Eser KARLIK	
16	Contact information of the Course Coordinator:	E-posta:gunesy@uludag.edu.tr Tel: (224) 294 20 16 Adres: Elektronik Mühendisliği Bölümü 5. Kat, No:532	
17	Website:		
18	Objective of the Course:	To inform students about insulating, conducting, super-conducting and magnetic materials used in electrical and electronics engineering.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	To understand characteristic properties and structures of insulating and conducting materials
		2	Ability to identify basic problems of electrical materials
		3	Ability to solve the basic problems of electrical materials
		4	To know the importance and application fields of super-conductivity
		5	To have knowledge about structures and characteristic properties of diamagnetic, paramagnetic, ferromagnetic and ferrite materials.
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Introduction to structures and properties of electrical and electronic materials	

2	Electrical conductivity in insulators, DC conductivity in dielectric materials, volumetric resistivity and surface resistance, effects of environmental conditions on volumetric resistivity	
3	Polarization in dielectric materials, dielectric permittivity, dielectric constant	
4	Local Lorenz field, Clausius-Musotti equation, variation of dielectric permittivity with frequency and temperature	
5	Dispersion of electron, ion and dipole vibration polarization	
6	Dielectric losses, variation of dielectric losses with frequency, temperature and EM field	
7	Electrical breakdown of electrical and electronic materials	
8	Midterm Exam + General Review	
9	Non-electrical properties of electronic materials	
10	Quality control and safety of electronic materials, widely used insulators and ceramics	
11	Conductors- physical properties, variation of physical properties with frequency and temperature, widely used metals	
12	Super-conductivity and superconductors	
13	Ferrites, widely used magnetic materials	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	1.00	14.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	2	5.00	10.00
Others	0	0.00	0.00
Final Exams	1	8.00	8.00
Total Work Load			60.00
Total work load/ 30 hr			2.00
ECTS Credit of the Course			3.00

23	Assesment		
TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**	
Midterm Exam	2	50.00	
Home work-project	0	0.00	
Final Exam	1	50.00	
Total	3	100.00	
Contribution of Term (Year) Learning Activities to Success Grade		50.00	
Contribution of Final Exam to Success Grade		50.00	
Total		100.00	
Measurement and Evaluation Techniques Used in the Course			

24	**ECTS / WORK LOAD TABLE**

Materials.
Harper, 3rd Ed., Mc Graw Hill, New York, 2005.
2. Malzeme Bilimi, Kaşif Onaran, Bilim Teknik Yayınevi,
3. Handbook of Electrical and Electronic Insulating Materials, W.T. Shung, IEEE Press, New York, 1995.
Smith, McGraw Hill, Singapore, 1995.

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**			**3 Medium**			**4 High**			**5 Very High**				