



University of Tehran
School of Electrical and Computer Engineering

Course:	Electrical Engineering Materials									
Course type:	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Level:	Undergraduate <input type="checkbox"/> Graduate <input checked="" type="checkbox"/>									
Co-requisite(s):	None.									
Prerequisite(s):	None.									
Prerequisite by topic:										
Textbook(s):	1. Properties of Materials for Electrical Engineers. K. J. Pascoe, John Wiley & Sons, 1998. (ترجمه جواد فیض - چاپ مرکز نشر دانشگاهی - تهران) 2. Electrical engineering, Yu. Koritsky, Mir Publishers, Moscow, 1970. 3. A Textbook of Electrical Engineering Materials, R. K. Rajput, Laxmi Publications, New Delhi, 2006.									
Coordinator:	Jawad Faiz, Professor, School of ECE.									
Goals:	1. Be familiar with materials used in different electrical engineering equipment. 2. Studying metallic and non-metallic conductors in different tools. 3. Be familiar with different types of semiconductor materials and their applications. 4. Be familiar with various alloys in electrical devices. 5. Getting knowledge on soft and hard magnetic materials. 6. Studying different methods for production of materials in electrical engineering.									
Outcome:	1. Introduction to electrical materials properties in different electrical equipment. 2. Choosing materials for different applications. 3. Using appropriate materials in electrical devices design. 4. Better understanding electrical devices based on material reactions. 5. Application of soft magnetic materials in static and dynamic electrical machines. 6. Permanent magnet materials and their wide applications in industry. 7. Designing specific devices based on electrical material properties.									

Topics:	<ol style="list-style-type: none"> 1) Introduction. 2) Materials with high conductivity. 3) Superconductors and Curio conductors. 4) Alloys, solders, and craters. 5) Non-metallic conductors. 6) Principles of solids band theory. 7) Statistical distribution of electrons in semiconductors. 8) Electrical conductivity in semiconductors. 9) Contacts phenomena in semiconductors. 10) Electronic process on semiconductors surface. 11) Optical and photo-electric phenomena in semiconductors- 12) Thermo-electric phenomena in semiconductors -Hall effect. 13) Materials production methods. 14) Magnetic materials. 15) Magnetization characteristics. 16) Soft magnetic materials and their applications. 17) Piezoelectric materials and their applications. 				
Computer usage:					
Assignments:					
Projects:	Investigation on a typical material for application in a given equipment.				
Grading:	<table style="width: 100%; border: none;"> <tr> <td style="padding-right: 20px;">Projects:</td> <td>30 %</td> </tr> <tr> <td>Final exam:</td> <td>70 %</td> </tr> </table>	Projects:	30 %	Final exam:	70 %
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Final exam:	70 %				
Further readings:	Current papers on new materials in electrical engineering.				
Prepared by:	Prof. Jawad Faiz				
Date:	Nov. 20, 2017				

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		