



MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering



Course Syllabus
Study Plan 2017: Power and Control Track

Course Code	Course Name	Credits	Contact Hours
0401205	Electrical Materials	3	3 T

INSTRUCTOR/COORDINATOR

Name	Dr. Saif Alnawayseh
Email	saif982@mutah.edu.jo
Office Hours	12:30-2:00 (Monday, Wednesday)

TEXTBOOK

Title	The Science and Engineering of Materials
Author/Year/Edition	Donald R. Askeland, Pradeep Phule, 4 th Edition, Thompson Books

Other Supplemental Materials

Title	Materials Science and Engineering: An Introduction.
Author/Year/Edition	W.D. Callister & D.G. Rethwish. John Wiley 2010, 8 th edition

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

Principles that determine the properties of conductors, semiconductors, and insulators. Electromechanical properties; diffusion, electrical conduction, thermal conduction; magnetic and optical properties.

B. Pre-requisites (P) or Co-requisites (C)

General Physics (2) (0302102) (P)

C. Course Type (Required or Elective)

Required prior 2021

SPECIFIC GOALS						
A. Course Learning Outcomes (CLOs)						
By the end of this course, the student should be able to:						
CLO1: Characterize structure, property performance relationship [1].						
CLO2: Identify the structure of different types of materials [1].						
CLO3: Describe mechanical, electrical, and magnetic behavior of metals, polymers, and ceramics [1].						
CLO4: Select materials such as conductors, semiconductors, insulators, magnetic and electro-optic materials for various electric and electronic applications [1].						
B. Student Learning Outcomes (SOs) Addressed by the Course						
1	2	3	4	5	6	7
✓						

BRIEF LIST OF TOPICS TO BE COVERED		
List of Topics	No. of Weeks	Contact Hours
Chapter 1: Introduction, Classification of Engineering Materials, Structure Property – Performance relationship	1	3
Chapter 2: Atomic Structure and Interatomic Bonding.	3	9
Chapter 2: Crystal structure.	2	6
Chapter 3: Imperfections in Solids.	1	3
Chapter 4: Diffusion.	1	3
Chapter 5: Electrical Properties of Metals, semiconductors, Insulators, and Dielectrics. electron band structures for solid materials, electrical conductivities of different materials, dielectric, ferroelectric, and piezoelectric behavior	3	9
Chapter 6 : Magnetic material properties.	2	6
Chapter 7: Optical Properties of Materials, Electro-Optical Behavior.	1	3
Total	14	42

EVALUATION		
Assessment Tool	Due Date	Weight (%)
Mid Exam	According to the university calendar	30

Course Work (Homeworks, Quizzes, Projects, ...etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)

Relationship to program outcomes	
ABET 1-7	Engineering Student Outcomes
1	√ an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3	an ability to communicate effectively with a range of audiences.
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

