



Jordan University of Science and Technology
Faculty of Science & Arts
Chemistry Department

CHEM473A Special Topics In Chemistry (A)

Summer Semester 2019-2020

Course Catalog

3 Credit Hours. This course is intended to give the students an overview of a variety of functional materials employed in optical, dielectric, magnetic and other sensors and actuators devices. The course emphasizes the interplay between the intrinsic molecular structural properties and their utilization in technical applications in modern devices. This course focuses on the physical and chemical concepts, principles and theories behind the application of substances and composites in different technology and biotechnology. It also introduces the student to how micro-structural properties translate into optical, electrical? etc. properties. Functional materials cover all classes of organic, inorganic and hybrid materials.

Text Book

Title	New Materials for the 21st century. Last edition.
Author(s)	Ball, Philip.
Edition	1st Edition
Short Name	1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
2	- Functional Materials: Electrical, Dielectric, Electromagnetic, Optical & Magnetic Applications	Deborah D L Chung	1st Edition	
3	Chemistry of the Elements	Greenwood & Earnshaw	2nd Edition	

Instructor

Name	Prof. Mohammad Fares
Office Location	D3L0
Office Hours	

Email	fares@just.edu.jo
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Class Schedule & Room
Section 1: Lecture Time: Sun, Mon, Tue, Wed : 14:30 - 16:00 Room: منصة الكترونية

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	1.0 Introduction to functional materials.	Ref 1 From 1, From 2
Week 2	2.1 Photoluminescence	Ref1 From 1, Ref2 From 2
Week 3	2.2 Electro-luminescence (EL)	ref 1 From 1, Ref2 From 2
Week 4	3.1 Electronic Conductivity in Solids	ref 1 From 1, Ref2 From 2
Week 5	3.2 Electroactive Organic Materials	ref1 From 1, Ref2 From 2
Week 6	4.0 Energy Conversion Materials	Ref1 From 1, Ref2 From 2
Week 7	4.1 Fuel Cell	Ref1 From 1, Ref2 From 2
Week 8	4.2 Photovoltaic Cell	Ref1 From 1, Ref2 From 2
Week 9	4.3 Thermoelectric	Ref1 From 1, Ref2 From 2
Week 10	4.4 Piezoelectric 4.5 Pyroelectric	Ref1 From 1, Ref2 From 2
Week 11	5.0 Energy Storage Devices, 5.1 Primary Batteries	Ref1 From 1, Ref2 From 2
Week 12	5.2 Secondary Batteries 5.2.1 Lead Acid Battery	Ref1 From 1, Ref2 From 2
Week 13	5.2.2 Li rechargeable battery	Ref1 From 1, Ref2 From 2
Week 14	Ni-MH battery 5.2.4 Na-S battery 5.2.5 Ni-Cd battery	Ref1 From 1, Ref2 From 2

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Optical and photonic Materials [1a, 1c, 1g]	25%	
Electrical Properties of Solid Materials [1a, 1e, 1i]	25%	
4.0 Energy Conversion Materials [1c, 1j, 1k]	25%	
Energy Storage Materials/Devices [1j, 1k]	25%	

Relationship to Program Student Outcomes (Out of 100%)										
a	b	c	d	e	f	g	h	i	j	k
16.67		16.67		8.33		8.33		8.33	20.83	20.83

Evaluation	
Assessment Tool	Weight
First	30%
Second Exam	30%
Final Exam	40%

Policy	
Make-Up Exams	Make-up exams will be offered for valid reasons only with consent of the Dean. Make-up exams may be different from regular exams in content and format.
Attendance	Lecture attendance is mandatory. Student is allowed maximally 20% absentia of the total module hours. More than this percentage, student with an excuse will be drawn from the module. Otherwise, student will be deprived from the module with zero mark assigned.

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