

Course E-Syllabus

1	Course title	Materials Chemistry
2	Course number	0303453
3	Credit hours	3 (3+0)
	Contact hours (theory, practical)	42-44 hours
4	Prerequisites/corequisites	0303342-physical chemistry 2
5	Program title	Chemistry
6	Program code	03
7	Awarding institution	The University of Jordan
8	School	Science
9	Department	Chemistry
10	Level of course	B.Sc.
11	Year of study and semester (s)	3 rd and 4 th year
12	Final Qualification	
13	Other department (s) involved in teaching the course	none
14	Language of Instruction	English
15	Teaching methodology	<input type="checkbox"/> Blended <input checked="" type="checkbox"/> Online
16	Electronic platform(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
17	Date of production/revision	27/09/2020

18 Course Coordinator:

Name: Imad Hamadneh
Office number: 28
Phone number: 22164
Email: i.hamadneh@ju.edu.jo

19 Other instructors:

Name:
Office number:
Phone number:
Email:

Name:
Office number:
Phone number:
Email:

20 Course Description:

This introductory course covers the historical and definition of materials and chemistry, fabrications, Crystalline, and amorphous solids, including bonding in solids (ionic, covalent, metallic, molecular) electrical structure, physical and structural properties, phase diagram, and band theory.

21 Course aims and outcomes:

A- Aims:

To understand the terms and principles of Materials from chemistry perspectives

B- Intended Learning Outcomes (ILOs):

Upon successful completion of this course, students will be able to:

1. To correlate the principles of chemistry in Materials Chemistry
2. To solve the problems about the area of Materials Chemistry.
3. To settle the problems in Materials Chemistry in groups as scheduled.

22. Topic Outline and Schedule:

Week	Lecture	Topic	Teaching Methods*/platform	Evaluation Methods**	References
1	1.1	Historical background	Microsoft Teams		1
	1.2	Classification of Materials	Microsoft Teams		1
	1.3	Design and fabrication of new materials.	Microsoft Teams		1
2	2.1	Atomic Structure	Microsoft Teams		1
	2.2	Primary Bonding	Microsoft Teams		1
	2.3	Secondary Bonding	Microsoft Teams		1
3	3.1	Crystal structure	Microsoft Teams		1
	3.2	Unit Cells	Microsoft Teams		1
	3.3	directions	Microsoft Teams	Quiz for the above topics	1
4	4.1	Linear density	Microsoft Teams		1
	4.2	planes	Microsoft Teams		1
	4.3	Planner density	Microsoft Teams		1
5	5.1	Determination of Miller indices	Microsoft Teams		1
	5.2	Single Crystals & Polycrystalline Materials	Microsoft Teams		1
	5.3	Powder x-ray diffraction	Microsoft Teams		1
6	6.1	Determination of Crystal Structures	Microsoft Teams		1
	6.2	Silicate Ceramics	Microsoft Teams		1
	6.3	Imperfections	Microsoft Teams		1
7	7.1	Defects	Microsoft Teams		1
	7.2	Types of defects	Microsoft Teams		1
	7.3	Point Defects and defect concentration	Microsoft Teams		1
8	8.1	Solid Solutions	Microsoft Teams		1
	8.2	Physical properties of ceramics	Microsoft Teams		1
	8.3	Types of ceramics	Microsoft Teams		1
9	9.1	Electrical properties and ohm's law Effect of temperature	Microsoft Teams		1
	9.2	Electrical properties and temperature	Microsoft Teams	Midterm-exam for the above topics	1
	9.3	Structural	Microsoft Teams		1

		properties			
10	10.1	Scanning Electron Microscopy (SEM)	Microsoft Teams		1
	10.2	Sample preparation for SEM	Microsoft Teams		1
	10.3	Transmission Electron Microscopy (TEM)	Microsoft Teams		1
11	11.1	The Amorphous state	Microsoft Teams		1
	11.2	Synthesis of ceramic materials	Microsoft Teams		1
	11.3	Conventional solid state method	Microsoft Teams		1
12	12.1	Chemical methods	Microsoft Teams		1
	12.2	Sol-gel method	Microsoft Teams		1
	12.3	Co-precipitation method	Microsoft Teams		1
13	13.1	Nanomaterials and nanotechnology	Microsoft Teams		1
	13.2	Way of synthesis Bottom up & top down approaches	Microsoft Teams		1
	13.3	Nanoscale building blocks.	Microsoft Teams		1
14	14.1	Metals nano particles	Microsoft Teams		1
	14.2	Carbon nanotube (CNT)	Microsoft Teams		1
	14.3	Polymer/clay nanocomposites	Microsoft Teams		1
15	15.1	Biomaterial applications	Microsoft Teams		1
	15.2	Polymers and its applications	Microsoft Teams		1
	15.3	Superconductors	Microsoft Teams	Final Exam for all topics	1

- Teaching methods include: Synchronous lecturing/meeting; Asynchronous lecturing/meeting
- Evaluation methods include: Homework, Quiz, Exam, pre-lab quiz...etc

23 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
quiz	20	Historical background Classification of	5	LM system

		Materials Design and fabrication of new materials. Atomic Structure Primary Bonding Secondary Bonding Crystal structure Unit Cells Directions Linear density planes Planner density Determination of Miller indices		
Midterm	30	Single Crystals & Polycrystalline Materials Powder x-ray diffraction Determination of Crystal Structures Silicate Ceramics Imperfections Defects Types of defects Point Defects and defect concentration Solid Solutions Physical properties of ceramics Types of ceramics Electrical properties and ohm's law Effect of temperature Electrical properties and temperature	10	LM system
Final	50	All topics	16	LM system

24 Course Requirements (e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

Students should have a computer, internet connection, webcam, account on Microsoft Teams platform

25 Course Policies:

- A- Attendance policies:
- B- Absences from exams and submitting assignments on time:
- C- Health and safety procedures:
- D- Honesty policy regarding cheating, plagiarism, misbehavior:
- E- Grading policy:
- F- Available university services that support achievement in the course:

26 References:

- A- Required book(s), assigned reading and audio-visuals:
 - 1-Fundamentals of Materials Science and Engineering (10thEd) William D. Callister, Jr.

- B- Recommended books, materials and media:
 - 2-The Science and Engineering of Materials (6th Ed), Donald Askeland

27 Additional information:

Name of Course Coordinator: -Imad Hamadneh---Signature: --Imad Hamadneh--- Date: 29/10/2020

Head of Curriculum Committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of Curriculum Committee/Faculty: ----- Signature: -----

Dean: ----- Signature: -----