



Course Specifications

Course Title:	Solid State Chemistry
Course Code:	2043203-2
Program:	Bachelor in Chemistry
Department:	Department of Chemistry
College:	College of Sciences
Institution:	Taif University

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A. Course Identification

1. Credit hours: 2 (Theoretical)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 6 th Level/2 nd Year
4. Pre-requisites for this course (if any): General Chemistry 2 (2042103-3)
5. Co-requisites for this course (if any): NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 Theoretical hours/ Week	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (specify)	-
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to introduce students to structure, synthesis and properties of solid phase materials. Various topics are covered including: basic concept of crystal structure and bonding crystal, closed packed structure of simple metal crystals, properties of solid materials and synthesis methods of solid materials in different forms.

2. Course Main Objective

This course aimed at knowing essential principles of solid state materials concerned with their structure, synthesis and properties.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	Identify the amorphous and crystalline materials, Isotropic and anisotropic	K1

CLOs		Aligned PLOs
1.2	Memorize the types of Crystal Systems, Lattices parameter and Crystal defects	K2
2	Skills:	
2.1	Explain the differences between: Amorphous and crystalline materials, Symmetry elements and the Seven Crystal Systems	S1
2.2	Calculate: the Miller indices, calculation using Bragg's Law, coordination number, number of atoms per unit cell, mass of unit cell	S1
3	Values:	
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the solid materials	2
2	Atomic Structure and Bonding in Solids	4
3	Crystals Structures	4
4	Imperfection in Solids (Defects)	4
5	Diffusion in solids	4
6	Solids Solutions and Phase Equilibrium	4
7	Preparative Methods in Solids State	4
8	Introduction to Materials Science and Engineering	4
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Identify the amorphous and crystalline materials, Isotropic and anisotropic	Lecture	Written exam
1.2	Memorize the types of Crystal Systems, Lattices parameter and Crystal defects	Lecture	Written exam
2.0	Skills		
2.1	Explain the differences between: Amorphous and crystalline materials, Symmetry elements and the Seven Crystal Systems	Lecture	Homework Assignment
2.2	Calculate: the Miller indices, calculation using Bragg's Law,	Lecture -Solving problems	Homework Assignment

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	coordination number, number of atoms per unit cell, mass of unit cell		
3.0	Values		
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork	Collaborative Learning	Individual presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments (Electronic)	Throughout Semester	15%
2	Individual presentations	Throughout Semester	5%
3	Periodical Exam	7/8	15%
4	Mid Term Exam	11/12	15%
5	Final exam	16	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;

- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • Solid State Chemistry: An Introduction, Lesley E. Smart, Elaine A. Moore, 2004, Latest Edition. ISBN: 9780367135720. • Materials Science and Engineering, William D. Callister, Jr. David G. Rethwisch, Latest Edition. ISBN: 978-1-119-40549-8.
Essential References Materials	<ul style="list-style-type: none"> • Essential of Physical Chemistry, Arun Bahl, B. S. Bahl, and G. D. Tuli , S Chand & Co Ltd. (2010), Latest Edition. ISBN: 978-8121929783.
Electronic Materials	<ul style="list-style-type: none"> • Saudi Digital Library (SDL)
Other Learning Materials	<ul style="list-style-type: none"> • Learning Management System (Blackboard) • Online videos for solid state chemistry

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	A classroom with movable tables and chairs conducive to group discussion and teamwork.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	--

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	Students	Survey (indirect method)
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department Council/ Quality assurance committee
Reference No.	7-3-1445
Date	27/2/1445 HJ 12/09/2023 G

