



Course Specification

(Bachelor)

Course Title: Solid State Physics 1

Course Code: PHYS 0381

Program: Physics

Department: Physics

College: Science

Institution: Majmaah University

Version: I

Last Revision Date: 9/12/2024



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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

- A. University College Department Track Others
- B. Required Elective

3. Level/year at which this course is offered: (Level 6, 3rd year)

4. Course General Description:

This course introduces students to the fundamental concepts of solid-state physics. It covers the basic principles of crystallography, the properties of crystalline solids, and an introduction to the theories of thermal and optical properties of materials.

5. Pre-requirements for this course (if any):

PHYS 0342

6. Co-requisites for this course (if any):

Nil

7. Course Main Objective(s):

The course aims to provide students with a comprehensive understanding of solid-state physics, starting with the field's fundamental concepts. It will explore the basic principles of crystallography and emphasize the role of X-ray diffraction in determining the structure of materials. Students will also examine the thermal properties of solids, followed by an analysis of the optical properties of various materials. This approach will offer a well-rounded perspective on the key aspects of solid-state physics.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		



3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Ability to describe the atomic arrangement in different crystal structures.	K1	Lectures	Exams, homework, classwork, quizzes.
1.2	Gain knowledge of the basic principles and properties of crystalline solids.			
...				
2.0	Skills			
2.1	Analyze and interpret X-ray diffraction data to determine the structure of crystalline materials.	S1	Problem solving. Homework	Exams, homework, classwork, quizzes. Assignment
2.2	Conduct experiments or simulations to investigate the properties of solid materials, including crystallographic analysis.			
...				



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and responsibility			
3.1	Commit to ethical scientific practices, ensuring accurate data collection and proper interpretation in research involving material properties.	V2	Presentation, reports	Oral exams, Assignments
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.1	Introduction to Solid-State Physics	3
2.2	Definition of Crystals	3
3	Types of Crystal Structures	3
4	Introduction to Bravais Lattices	3
5	Crystal Symmetry and Lattice Types	3
6	Introduction to Miller Indices	3
7	Orientation and Direction in Crystals	3
8	Principles of X-ray Diffraction	3
9	X-ray Diffraction Techniques	3
10	Specific Heat in Solids	3
11	Heat Capacity of Crystals	3
12	Introduction to Optical Properties	3
13	Absorption and Transmission	3
14	Summary and Advanced Topics	3
15	Final Review and Exam Preparation	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid exam*	week 6	15%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	e-learning quizzes	One/ semester	10%
3.	Homework	Every Lecture	15%
4.	Discussions	Every week	10%
5.	Writing Report	One/ Semester	10%
6.	Final exam *	End of the semester	40%
7.	Final Exam	16 th	40 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Solid State Physics: An Introduction to Principles of Materials Science, Springer Verlag, 2010
Supportive References	Introduction to Solid-State Physics, Wiley, 8th Edition, 2004
Electronic Materials	Electronic Saudi Library
Other Learning Materials	https://www.guru99.com/data-science-tutorial.html

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, data show, Smart Board, software
Technology equipment (projector, smart board, software)	Computer Lab. and Internet Lab.
Other equipment (depending on the nature of the specialty)	Library, Wi-Fi internet connections

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Staff members (Peer Reviewer)	Direct (Student evaluation electronically organized by Deanship of registration and





Assessment Areas/Issues	Assessor	Assessment Methods
		admission)/ Verification of students' papers
Effectiveness of Students assessment	Staff members (Peer Reviewer)	Indirect (Frequent meetings and consultation among the teaching staff)
Quality of learning resources	Staff members (Peer Reviewer)	Indirect (Frequent meetings and consultation among the teaching staff)
The extent to which CLOs have been achieved	Quality member	Direct (Meeting between course coordinators and the tutors)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physics Department council
REFERENCE NO.	
DATE	

