

مختصر توصيف المقرر

:(Course Information)

معلومات المقرر *

اسم المقرر:	فيزياء الجوامد 1
رقم المقرر:	فيز 3712
اسم ورقم المتطلب السابق:	فيز 3522
اسم ورقم المتطلب المرافق:	--
مستوى المقرر:	السادس
الساعات المعتمدة:	(0+0+3)3
Module Title:	Solid State Physics I
Module ID:	PHYS 3712
Prerequisite (Co-requisite) :	PHYS 3522
Co-requisite :	--
Course Level:	Sixth
Credit Hours:	3 (3+0+0)

Module Description

وصف المقرر :

CRYSTAL STRUCTURE

Lattices (Bravais and non-Bravais lattices), Primitive and non-primitive unit cell, Wigner-Seitz unit cell.

CRYSTAL PLANES AND ORIENTATION

Symmetry and symmetry operations, Miller indices and planes, Classification of lattices, 2-dimensional and 3-dimensional lattices, (NaCl, CsCl, ZnS and diamond lattices), Reciprocal lattice.

CRYSTAL DIFFRACTION

Bragg's law, Von-Laue equation, Experimental techniques of X-ray diffraction (Laue method, Rotating crystal method, Powder method), Electron diffraction, Neutron diffraction.

CRYSTAL BINDING

Covalent bonding, Metallic bonding, Hydrogen bonding, Ionic bonding, Cohesive energy of ionic crystals, Van-der-Waals bonding, Van-der-Waals London interaction.

LATTICE VIBRATIONS

Dispersion relation of phonons for one-dimensional Mono-atomic and Diatomic linear lattices, Physical difference between optical and acoustic branches, Excitation of optical branch, Quantization of Elastic Waves Phonons, -Phonon Momentum.

HEAT CAPACITY OF SOLIDS

Lattice heat capacity, Dulong and Petit Law for specific heat of solids, Einstein Model of specific heat of solids, Debye model of specific heat of solids with high and low temperature limitations.

Module Aims

أهداف المقرر :

1	Aim of this course is to provide the fundamentals of Solid State Physics.	1
2	Understand some basics properties of materials in form of solid state	2
3	Give some knowledge and behaviour of Solid Materials in different environment	3

Learning Outcomes:

مخرجات التعليم:

1	Fundamental Concepts of Solid State Physics and Crystal Structure	1
2	Can conduct general literature survey on particular topic of Solid State Physics	2

3	Conduct and present relevant task in a group and learn time management.	3
4	Problem solving on particular topic	4

Course Contents:

محتوى المقرر:

قائمة الموضوعات (Subjects)	عدد الأسابيع (Weeks)	ساعات التدريس (Hours)
CRYSTAL STRUCTURE	2	6
CRYSTAL PLANES AND ORIENTATION	2	6
CRYSTAL DIFFRACTION	2	6
CRYSTAL BINDING	2	6
LATTICE VIBRATIONS AND THERMAL PROPERTIES OF SOLID	2	6
HEAT CAPACITY OF SOLIDS	3	9
REVIEW	1	3

Textbook and References:

الكتاب المقرر والمراجع المساندة:

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
2005	(Wiley, New York; Chichester	C. Kittel and P. McEuen,).	Introduction to solid state physics, 8th ed.
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference
2012	Cambridge University Press, Cambridge,	P. Phillips	Advanced solid state physics, 2nd ed.
2010	CRC Press, Boca Raton; London	S. A. Holgate	Understanding solid state physics.
1975	Addison-Wesley Pub. Co, Reading, Mass; London	M. A. Omar World student series ed	Elementary solid state physics: principles and applications,