Course specifications

A- Administrative Information

Program(s) on which the course is given: **Post-graduate student of Applied Mathematics.**

Major or minor element of program: **Major, Minor**

Department offering the program **Mathematics Applied Mathematics**.

Department offering the course: **Mathematics**

Academic year / Level: Pre-Master in Applied Mathematics

Date of specification approval: September 2008

Title: Solid State physics **Code:** M 6213

Credit Hours: 2 **Lecture:** 2

Tutorial: 0 **Practical:** 0 **Total:** 2

B- Professional Information

1 – Overall aims of course

Upon successful completion of this course, the student should be able to define the structure of lattice , crystal and reciprocal space. Study some ways for driving the wave of the lattice point. Using some properties and relation in the space and make compaction between ordinary and reciprocal lattice and crystal

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

a1- In this course, we display to caver some properties and relation in the space and make compaction between ordinary and reciprocal lattice and crystal

b- Intellectual skills

b_1 – Apply appropriate methematical methods on the problems of Solid State physics

b2- Plan and execute a mathematical investigation independently.

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c- Professional and practical skills

The student should to able to solve some problems such as:-

c1- Make appropriate use of the Lagrangian equation with the aid of analyze or computational method to analyze forces between the lattice points.

d-General and transferable skills

d1- Apply the techniques PC and Internet to solve the specific topics related to the course material.

d2- The students' oral communication during presenting their own written reports.

d3- Work effectively the idea of teamwork through assigning a group of students for each report.

3- Contents

Topic	No. of hrs	Lecture
1- Geometrical and physical bases in lattice space and crystal structure	2	1
2- Definition and properties of reciprocal at space	2	1
3- Lattice vibration and mathematical basis in Q.M	6	3
4- Bloch's theorem in non degenerate and degenerate case	4	2
5- Cyclic boundary condition and K-lattice space	6	3
-some general properties and relations	2	
6- Dispersion relation in optical and a acoustical and isotropic medium	2 4	1 1
7-Application in the dispersion relation		2
8- Quantum Mechanics and lattice vibration		

4– Teaching and learning methods

4.1- Course notes

4.2- Reports Assignment
4.3- Oral presentations

5- Student assessment methods

5.1 Reports to assess skill of collecting data & ability of team work

5.2 Oral to assess skill of discussing and analyzing the report

5.3 mid-term exam to assess understanding and memorizing skills

5.4 Final term Exam to assess overall performance

Assessment schedule

Assessment 1 : Reports	1report/3 weeks
Assessment 2 : report defense	every 3 weeks
Assessment 3 : mid-term	7th week
Assessment 4 : Final term	14th week

Weighting of assessments

20 %	Mid-Term Examination
60 %	Final-term Examination
10 %	Oral Examination.
10 %	Other types of assessment
100%	Total

Any formative only assessments

6- List of references

Essential books(text books)

7- Facilities required for teaching and learning

Course coordinator: Dr. Kawsar Mohamed Hassan

Head of Department: Prof. Dr. Mohamed A. Ramadan

Date: / / 2010