Solid Lab.

Course Book – (4th Year Physics– Medical Branch)

Lecturer's name

Prof. Dr. Tariq Abdul-Hameed Abbas
M.Sc. Sarwin Yaseen Hussein

Academic Year: 2022/2023

Course Book (Lab)

1-Course Name	Solid state (lab.)
2-Lab. Staff	Prof.Dr.Tariq A. Abbas M.Sc. Sarwin yaseen Hussein
3-Department/ College	E-mail: Sarwin.hussein@su.edu.krd Website: https://sites.google.com/a/su.edu.krd/sarwin-yassin-hussein/
4-Contact	Practical: 2
5-Time (In hours) per week	**Wednesday (8:30-10:30) am, (10:30-12:30), (12:30-2:30) pm**
6-Office Hours	At least10 h/week
7- Course Code	n/a
8- Teacher's academic profile	Studied an undergraduate degree in Physics science at Salahaddin University-Erbil between the years of 2003-2006. After graduation in 16-5-2007 I got a position in Salahaddin University as a laboratory demonstrator (Solid Lab, general physics lab, atomic lab and Electric lab. General physics lab). I stayed with the job for more than 16 years. In 2012. I obtained MSc in thin film preparation. The title of my MSc dissertation was about the effect of Substrate Temperature and Copper salt Concentration on Structuraland Optical Properties of Sprayed Cu2ZnSnS4 thin film. . 28-5-2013 Assistance Lecturer in University of Salahaddin- College of science physics department - Erbil -Iraq For academic year 2016-2017 I've taught Semiconductor physics and superconductivity for fourth year Physics student in Physic department and solid-state lab for medical and general fourth year Physics student.
9- Keywords	N/A

10- **Course Overview:**

The Solid-State lab is one of the important labs for Physics student to

1- Distinguish type of solid material (metal, semiconductor and insulator).

2- Understanding the behavior of material under electric, magnetic and temperature effects, 3-

We will try to give the information about how external energy can interact with mater.

4- The most important subjects' student can get information will lead to understand electronic thermal properties of solids such as thermal conductivities and thermoelectric power as well as calculating the energy band structure in solids.

5- By understanding hall effect, X-ray diffraction and electron diffraction student can get information about crystal stricture interplanier distance and lattice constant.

11- **Course Objective:**

Solid State lab Physics is one of the important labs which serves students in Physics, In organic chemistry, Materials Science, Mechanical Engineering and electronic engineering for understanding the formation and electronic properties of solid materials. In Medical Physics people need to understand how solid materials can be used to detect radiation signals such as X-ray, Gamma ray and cosmic ray. Understanding Solid State will also help to understand how instruments such as CT scan, MR imaging, digital camera, photo detector sad m any other similar instruments are working. The information will also give abilities to people to improve their mind to understand and build new instruments.

This field in interring all subjects from physics, How to understand this new technology, we need to understand the type of materials (metal, semiconductor ,insulator) by solid state lab physics .We need to understand its formation and properties as well its application.

12- **Student's obligation**

Normally, students are obliged to attend all the lectures and take notes during the experiment. In addition, in lab participation would be a bonus of the students to widen their knowledge and understand the module thoroughly.

During this year the student must be report about experiment

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13- **Forms of Teaching**

In solid state laboratory, the staff members of within the first week will explain the outlines of the lab, and all experiments as well as the regulations and policies to be followed by the student inside the lab. To performthe experiment safely. The lab as a whole accommodates seven experiments per week, since each groupconsists of at least 14 students, then every two students make one experiment altogether in one week. In this manner the student will complete the experiments cyclically in the course. Foreach performed experiment thestudent should prepare a scientific report given to the staff in the next week. The student will asks to make atleast one seminar relevant to the solid laboratory experiments in which all the students will participate in the

discussions and evaluations.

14- Assessment scheme

(All exams have 20 marks+ 30 final exam), (every week each student prepared the report about the experiment 10%) (During this year the student must make one seminar 2.5%), (quizzes 2.5%)

10% + 2.5% + 2.5%+ 5% one semester examination = 20% +30% final exam

15- Student Learning Outcome:

Solid State Physics make students to understand how condensed matter; behave in their thermal and electrical properties. Help the students after graduation to get work in areas of electronics and devices as well as places regarding X-ray images and CT-can centres since a part of the solid state physics subject, they have to study the X- ray crystallography and the formation of matter.

16- **Course Reading list and References:**

1-Principles of Solid State Physics, 1974 *R.A. Levy*,

2-Introduction to Solid State Physics, 8th Edition 2008 *Kittel*

3-Solid State Physics, 2nd Edition 1988 *J S Blakemore*

17- The Topics	Lecture's Name
Exp.1: ***Electron Diffraction from Single Crystal***	Prof. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yassin Hussein **Week (2)**
Exp.2: ***Resistivity in metal***	Prof. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yassin Hussein **Week (3)**
Exp.3: ***Hall Effect in Metals***	Prof. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yaseen Hussein **Week (4)**
Exp.4: ***Dielectric Constant of Solids.***	Prof. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yaseen Hussein **Week (5)**

Exp.5: ***Optical Absorption in Semiconductors***	Prof. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yaseen Hussein **Week (6)**
Exp.6: ***X-Ray Diffraction from Single Crystal***	Prof. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yassin Hussein **Week (7)**
Exp.7: ***Thermoelectric power***	Prof. Dr. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yassin Hussein **Week (8)**
Exp.8: ***Energy Gap of SemiconductorsMeasured by Thermal Method.***	Prof. Dr. Tariq Abdul Hameed Abbas M.S.c. Sarwin Yassin Hussein **Week (9)**
Exp.9: ***Measurement of susceptibility of liquid by Quince's method.***	Prof. Dr. Tariq Abdul Hameed Abbas M.Sc. Sarwin Yassin Hussein **Week (10)**
Exp.10: ***X-ray powder photography.***	Prof. Dr. Tariq Abdul Hameed Abbas M.Sc. Sarwin Yassin Hussein **Week (11)**

Exp.11: ***Dielectric constant in solids.***	Prof. Tariq Abdul Hameed Abbas M.Sc. Sarwin yaseen Hussein **Week (12)**
Exp.12: ***Thermoelectric power.***	Prof. Dr. Tariq Abdul Hameed Abbas M.Sc. Sarwin Yaseen Hussein **Week (13)**
Exp.13: ***Magneto resistance.***	Prof. Dr. Tariq Abdul Hameed Abbas M.Sc. Sarwin Yaseen Hussein **Week (14)**

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes toenrich the course book with his/her valuable remarks.

پێداچوونەوەی هاوەڵ review Peer 21.

This course book must be reviewed and signed by a peer. The peer approves the contents of your course book by writing a few sentences in this section.

(Apeerispersonwhohasenoughknowledgeaboutthesubjectyouareteaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).

ئەم کۆرسبووکە دەبێت لەلایەن **هاوەڵێکی** ئەکادیمییەوە سەیر بکرێت و ناوەڕۆکی بابەتەکانی کۆرسەکە پەسەند بکات و چەند ووشەیەک بنووسێت لەسەر شیاوی ناوەڕۆکی کۆرسەکە و واژووی لەسەر بکات.

هاوەڵ ئەو کەسەیە کە زانیاری هەبێت لەسەر کۆرسەکە و دەبێت پلەی زانستی لە مامۆستا کەمتر نەبێت.