



Department of General Science

College of Basic Education

University of Salahaddin

Subject: Semiconductors

Course Book – (Year 2) ( 2<sup>nd</sup> Semester)

Lecturer's name: Dr. Wala Dizayee

Academic Year: 2022/2023

# Course Book

1. Course name	Semiconductors
2. Lecturer in charge	Wala Dizayee
3. Department/ College	General Science /Basic Education
4. Contact	e-mail: <a href="mailto:wala.dizayee@su.edu.krd">wala.dizayee@su.edu.krd</a> Tel: (optional)
5. Time (in hours) per week	For example Theory: 3 Practical: 0
6. Office hours	
7. Course code	
8. Teacher's academic profile	<a href="https://academics.su.edu.krd/wala.dizayee">https://academics.su.edu.krd/wala.dizayee</a>
9. Keywords	Semiconductors,
<b>10. Course overview:</b>  - This course will introduce students to the foundations of Semiconductors, therefore the course is intended to cover some of the standard concepts, like; Bonds of materials, Type of Semiconductors according to their structure, Fermi energy .... etc.  - Learn about the theory and applications of semiconductor concepts by using a simple and clear mathematic to explain the physics.  - Help the student to gain experience in reading and scientific writing.  -The course aims to introduce and explain the foundational concepts of semiconductor for students, which will help them to take up more advanced topics in later years.	
<b>11. Course objective:</b>  - The course will provide an introduction of basic semiconductor concepts.  - Consternate on a number of topics like; <b><u>semiconductor, Types, Properties, Classification of solid and mathematical equations</u></b> to explain the physical concepts.  - Clarify the physical concepts through a range of examples and applications.	

**12. Student's obligation:**

- Students should attend in all lectures, either in hall or online.
- Participation in classroom discussions and solving practical examples related to the subjects.
- Home works and quiz.
- The students are required to do two mid-term exams and a final exam.

**13. Forms of teaching**

- White board.
- Data Show power point presentation.
- Homework and problem solving in the class.
- Group activity & individual activity.
- Group assignments & individual assignments.

**14. Assessment scheme**

- One mid-term exams and a final exam.
- Daily Activity (Group activity & individual activity).
- Attendance of students.
- Homework (Group assignments & individual assignments).
- Reports.
- Posters.

**15. Student learning outcome:**

- The student will be familiar with the basic ideas to understand several concepts about **semiconductor, Types, Properties, Classification of solid and mathematical equations** and,...., etc.
- To gain experience about how to think scientifically and critically in seeking for new knowledge.


## 16. Course Reading List and References:

- Key references:

A- Useful references:

- 1- Introduction to solid state physics (Charles kittel).
- 2- Elementary solid state physics principle and application (M.A Omer).
- 3- Solid state physics.
- 4- Electronic circuit analysis and design (Donald A-Neamens).
- 5- Semiconductor of devices fundamentals (Robert F.pierrel).
- 6- Principle of semiconductor Devices (B Van zeghloroeck).
- 7- <https://inst.eecs.berkeley.edu/~ee130/sp03/lecture.html>
- 8- <https://ocw.ece.cornell.edu/courses/ece-5330-semiconductor-optoelectronics/ece-5330-lectures-notes-and-handouts/>
- 9- <https://ocw.ece.cornell.edu/courses/ece-5330-semiconductor-optoelectronics/ece-5330-homework-and-exams/>
- 10- <https://byjus.com/jee/semiconductors/> googd
- 11- <https://byjus.com/jee/semiconductors/>
- 12- <https://examsdaily.in/physics-study-materials-important-topics>
- 13- [https://chem.libretexts.org/Courses/College\\_of\\_Marin/CHEM\\_114%3A\\_Introductory\\_Chemistry/03%3A\\_Matter\\_and\\_Energy/3.03%3A\\_Classifying\\_Matter\\_According\\_to\\_Its\\_State-\\_Solid%2C\\_Liquid%2C\\_and\\_Gas](https://chem.libretexts.org/Courses/College_of_Marin/CHEM_114%3A_Introductory_Chemistry/03%3A_Matter_and_Energy/3.03%3A_Classifying_Matter_According_to_Its_State-_Solid%2C_Liquid%2C_and_Gas)

17. The Topics:	Lecturer's name
1- States of Matter: General Introduction 2- Properties Of Matter: General Introduction 3- Review on semiconductor historical and development industrial 4- Classification of solid by electrical conduction 5- Types of material 6- Atomic structure 7-Band structure of a material defines the band of energy levels that an electron can occupy 8- Electronic Materials 8-1- Insulator 8-2- Conductors 8-3- Semiconductor 9- Type of semiconductor 10- Intrinsic (Pure) Semiconductors 11- Extrinsic (Impure) Semiconductors 11-1- N-Type semiconductors 11-2- P-Type semiconductors 12-Types of solid state by electrical conduction 13- Electron in atom 14- Doping 15- Bohr's model for hydrogen atom 16- Calculations based on Bohr's Model 16-1- Radius of nth orbit 16-2- calculation of velocity	

<p>16-3- 2-Energy of electron in nth orbit</p> <p>17- Limitations of Bohr's Model</p> <p>18- Band theory of a solid</p> <p>19- Band Gap or Energy Band Gap</p> <p>20- Classification of material based on energy band theory:</p> <p>21-Fermi energy</p> <p>22- Direct and Indirect Band Gap Semiconductors</p> <p>23- Crystal defects in semiconductors</p>	
<b>18. Practical Topics ( If there is any)</b>	
<p><b>19. Examinations:</b></p> <p><b>Total :100%</b></p> <p>Final exam: 60%</p> <p>1<sup>st</sup> term: 40%</p> <p><b>1<sup>st</sup> term: 40%</b> </p> <p>Midterm exams: 30%</p> <p>Activates: 10% (Homework?? %, quizzes:?? % , Participation ?? %, poster?? %, presentation?? %, Group activity &amp; individual activity?? % and ,,,,,,,,, )</p>	
<b>20. Extra notes:</b>	
<p><b>21. Peer review:</b></p> <p>I read this course book it's very good and I signed on it.</p>	