Form: Course Syllabus		
	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	**Course Title**	Semiconductor Physics
2.	**Course Number**	0332971
3.	**Credit Hours (Theory, Practical)**	3 Theory
	Contact Hours (Theory, Practical)	3 Hours/Week
4.	**Prerequisites/ Corequisites**	Department Approval
5.	**Program Title**	PhD in Physics
6.	**Program Code**	021
7.	**School/ Center**	School of Science
8.	**Department**	Physics
9.	**Course Level**	
10.	**Year of Study and Semester (s)**	
11.	**Other Department(s) Involved in Teaching the Course**	
12.	**Main Learning Language**	English
13.	**Learning Types**	☑ Face to face learning ☐Blended ☐Fully online
14.	**Online Platforms(s)**	☐Moodle ☑ Microsoft Teams
15.	**Issuing Date**	2024
16.	**Revision Date**	2024

17. Course Coordinator:

Name:	Contact hours:
Office number:	Phone number:
Email:	

18. Other Instructors:

Name:
Office number:
Phone number:
Email:
Contact hours:
Name:
Office number:
Phone number:
Email:
Contact hours:

19. Course Description:

Elementary Electron Theory of Conductivity; The Fundamentals of the Band Theory of Semiconductors; Electron and Hole Statistics in Semiconductors; Kinetic Phenomena in Semiconductors; The Theory of Charge Carriers Scattering; Phenomena of Charge Carrier Recombination in Semiconductors; Contact Phenomena in Semiconductors and Heterostructures; Optical and Photoelectrical Phenomena in Semiconductors; General Methods of Preparing Semiconductor Materials; General Properties of Some elementary Semiconductors and Semiconducting Compounds; Amorphous and Organic Semiconductors.

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. **SO1:** to be able to demonstrate an advanced and comprehensive understanding of core physics concepts and specialized knowledge in a chosen field of research, contributing to the frontier of physics.
2. **SO2:** to be able to develop and execute independent, original research projects that address complex scientific problems, advancing theoretical and experimental physics.
3. **SO3:** to be able to apply advanced mathematical and computational techniques to analyze complex physical phenomena and critically evaluate scientific literature and experimental results.
4. **SO4:** to be able to effectively communicate complex physics concepts, research findings, and their significance through academic writing, presentations, and public outreach.
5. **SO5:** to be able to adhere to high ethical standards and professional responsibility in conducting research, including data integrity, ethical treatment of subjects, and the responsible use of resources.
6. **SO6:** to be able to demonstrate leadership and collaborative skills within multidisciplinary teams, contributing to the development of new scientific knowledge and promoting knowledge-sharing across disciplines.

7. **SO7:** to be able to cultivate the ability to adapt to new scientific advancements and continuously engage in professional development to contribute to innovation in the field of physics.
8. **SO8:** to be able to master experimental and computational techniques relevant to the research field, demonstrating competency in operating and developing specialized physics instrumentation and software.

21. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Students are expected to develop a good understanding of semiconductor physics and band theory.

2. Students are expected to develop a good understanding of charge carriers' statistics and semiconductor doping.

3. Students are expected to develop a fair understanding of homo- and heterojunction in semiconductor devices.

4. Students are expected to understand the basic semiconductor devices based on pn-junctions such as diodes, transistors and integrated circuits.

5. Students are expected to understand the recombination process and the related photo-electrical phenomena.

6. Students are expected to develop a basic knowledge of some of the semiconductor manufacturing processes.

Course ILOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating

٢٢. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program ILOs / Course ILOs	ILO (1)	ILO (2)	ILO (3)	ILO (4)	ILO (5)	ILO(6)
1	X	X	X	X	X	
2						
3	X	X	X			X
4	X			X	X	X
5						
6						
7						
8						

٢٣. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1							
	1.2							
	1.3							
2	2.1							
	2.2							
	2.3							
3	3.1							

	3.2							
	3.3							
4	4.1							
	4.2							
	4.3							
5	5.1							
	5.2							
	5.3							
6	6.1							
	6.2							
	6.3							
7	7.1							
	7.2							
	7.3							
8	8.1							
	8.2							
	8.3							
9	9.1							
	9.2							
	9.3							
10	10.1							
	10.2							
	10.3							
11	11.1							
	11.2							
	11.3							
12	12.1							
	12.2							
	12.3							
13	13.1							
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							
15	15.1							
	15.2							
	15.3							

2٤. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	ILO/s Linked to the Evaluation activity	Period (Week)	Platform
Midterm Exam	30%			8th week	Paper Based
Homework Assignments	20%			Biweekly	Paper Based
Class Project	10%			End of Semester	Theory or experiment
Final Exam	40%			End of Semester	Paper Based

٢٥. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):

٢٦. Course Policies:

A- Attendance policies: B- Absences from exams and submitting assignments on time: C- Health and safety procedures: D- Honesty policy regarding cheating, plagiarism, misbehavior: E- Grading policy: F- Available university services that support achievement in the course:

٢٧. References:

A- Required book(s), assigned reading and audio-visuals:

*Semiconductor Devices Physics and Technology, S. M. Sze, M. K. Lee, 3rd Edition or later editions.

*Semiconductor Physics and Devices, Donald A. Neamen, 4th Edition

B- Recommended books, materials, and media:

*Introduction to Semiconductor Physics and Devices, Mykhaylo Evstigneev

*The Physics of Semiconductors, Marius Grundmann, 3rd Edition

2٨. Additional information:

Name of the Instructor or the Course Coordinator:	Signature:	Date:
……	……..……	……..……
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
…….	……..……	……..……
Name of the Dean or the Director	Signature:	Date:
…….	……..……	……..……