Module Description

Module name	Semiconductor physics
Module level, if applicable	Bachelor of Physics
Code, if applicable	18H02133802
Subtitle, if applicable	-
Course, if applicable	-
Semester(s) in which the module is taught	5th
Person responsible for the module	Prof. Dr. Paulus Lobo Gareso, M. Sc.
Lecturer	1. Prof. Dr. Paulus Lobo Gareso, M. Sc. 2. Prof. Dr. Dahlang Tahir, M. Si. 3. Heryanto, S. Si, M. Si.
Language	Indonesian Language [Bahasa Indonesia]
Relation to Curriculum	Undergraduate degree program, elective, 5th semester
Type of teaching, contact hours	**Teaching methods** : [group discussion], [problem-based learning]. **Teaching forms** : [lecture], [tutorial]. CH: 08.00 - 16.00
Workload	For this course, students are required to meet a minimum of 90.67 hours in one semester, which consist of: - 26.67 hours for lecture, - 32.00 hours for structured assignments, - 32.00 hours for private study
Credit points	2 credit points (equivalent with 3.4 ECTS)

Requirements according to the examination regulations	Students have participated in at least 80% of the learning activities (Academic Regulations, Chapter VII). A student must have attended at least 75% of the lectures to sit in the exams.
Recommended prerequisites	-
Module objectives/intended learning outcomes	After completing the course, Students are able: **Intended Learning Outcomes (ILO):** **ILO 1 :** Students will have a relatively deep understanding in classical and basic quantum physics. [ILO 1 - Kn] **ILO 3 :** Students are able to use the basic principles of physics in technology application. [ILO 3 - Kn] **Course Learning Objective (CLO):** After completing this course, students are expected to be able to 1. Master the concept of semiconductor physics starting from atomic and crystal structures, direct and indirect semiconductor materials, semiconductor properties, followed by charge carrier transport and atomic diffusion. 2. Describe the semiconductor diode and junction heterostructure. 3. Explain the technique of growing epitaxy and semiconductor devices. **Sub CLO :** ILO 1 ⇒ CLO 1 : Using several quantities in Semiconductor Physics for atomic and crystal structures. ILO 3 ⇒ CLO 2 : Explain the difference between direct and indirect semiconductor materials. ILO 3 ⇒ CLO 3 : Explain the electron-hole transport due to the electric field and differences in electron-hole concentrations. ILO 3 ⇒ CLO 4 : Describe the mechanism of semiconductor charge carriers in diodes. ILO 3 ⇒ CLO 5 : Explain the process of growing epitaxy (thin film). ILO 3 ⇒ CLO 6 : Describe semiconductor devices.
Content	Students will learn about : 1. Using several quantities in Semiconductor Physics for atomic and crystal structures

	2. Explain the difference between direct and indirect semiconductor materials 3. Explain the electron-hole transport due to the electric field and differences in electron-hole concentrations 4. Describe the mechanism of semiconductor charge carriers in diodes 5. Explain the process of growing epitaxy (thin film) 6. Describe semiconductor devices
Forms of Assessment	Assessment techniques: [performance], [written test]. Assessment forms: [assignment], [presentation], [midterm exam], [final term exam]. Assignment = 32.5%, Presentation = 27.5%, Mid term exam = 15% Final term exam = 25% CLO 1 => ILO 1: 14% (7% Assignment 1 number 1-2, 7% MID exam number 1) CLO 2 => ILO 3: 15% (7% Assignment 1 number 3-4, 8% Mid exam number 2-3) CLO 3 => ILO 3: 13.5% (8.5% Assignment 2, 5% Final number 1) CLO 4 => ILO 3: 19.5% (14.5% Presentation, 5% Final number 2-3) CLO 5 => ILO 3: 13% (13% Presentation) CLO 6 => ILO 3: 25% (10% Assignment 3, 15% Final term exam number 4)
Study and examination requirements and forms of examination	**Study and examination requirements:** - Students must attend 15 minutes before the class starts. - Students must switch off all electronic devices. - Students must inform the lecturer if they will not attend the class due to sickness, etc. - Students must submit all class assignments before the deadline. - Students must attend the exam to get a final grade. **Form of examination:** Written exam: Essay
Media employed	Text book, Zoom, Gmeet, Video Conference, Video and PowerPoint Presentation. LED, Whiteboard, Learning Management System (SIKOLA).

Reading list	**Main :** ● Umesh K. Mishra and Jasprit Singh, Semiconductor Device Physics and Design, Springer. ● Donald A Neamen, Semiconductor Physics and Devices, McGraw Hill Company. **Support :** ● P.L. Gareso, 2019, *Bahan Ajar Fisika Semikonduktor*, Departemen Fisika - FMIPA - Universitas Hasanuddin.