**Course description form**

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| 1. **Course Name** | | | | | | | | |
| Electronics physics | | | | | | | | |
| 1. **Course Code** | | | | | | | | |
| EP107 | | | | | | | | |
| 1. **Semester/Year** | | | | | | | | |
| Fall Semester/First Year | | | | | | | | |
| 1. **The date this description was prepared** | | | | | | | | |
| 17 / 9 / 2023 | | | | | | | | |
| 1. **Available forms of attendance** | | | | | | | | |
| Face-to-Face theoretical lectures | | | | | | | | |
| 1. **Number of study hours (total) / number of units (total)** | | | | | | | | |
| 125/5 | | | | | | | | |
| 1. **Name of the course administrator** | | | | | | | | |
| Name: Assist. Prof. Dr. Hassan J. Mohammed Email:[Hassanjasim@uodiyala.edu.iq](mailto:Hassanjasim@uodiyala.edu.iq) | | | | | | | | |
| 1. **Course objectives** | | | | | | | | |
| 1. Develop problem-solving skills and understanding of electronics theory through the application of techniques.  2. To understand atomic structures and energy level.  3. To understand the voltage and current device and electronics of a particular circuit.  4. This course deals with the basic concept of semiconductor materials.  5. This is the basic subject of all semiconductor and electronic circuits.  6. To understand diode circuit and semiconductor problems. | | | **Objectives of the study subject** | | | | | |
| 1. **Teaching and learning strategies** | | | | | | | | |
| Type something like: The main strategy that will be adopted in delivering this module is to encourage students’ participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. | | | | **The Strategy** | | | | |
| 1. **Course structure** | | | | | | | | |
| **Evaluation method** | **Learning method** | **Required learning outcomes** | | | | **Name of the unit or topic** | **Hours** | **Week** |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the atomic structure system and the dual nature of light | | | | The Atom, Models, Wave Nature of Light, Dual Nature of Matter, Wave Function, Heisenberg’s Uncertainty Principle. | 2 | 1 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to energy packages and an introduction to insulators, conductors, and semiconductors | | | | Energy – Band Theory of Metals, Insulators and Semiconductors, Crystal Structure, Ionic. | 2 | 2 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of bonds and the internal structure of metals. | | | | Covalent and Metallic Bonding, Energy Hand of Crystals. Internal Structure of Materials Cell. | 2 | 3 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to Miller's coefficients and Braak's law | | | | Packing Miller Indices, Crystal Planes and Directions, Braggs Law and x – ray Diffraction Electronic Ballistics. | 2 | 4 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to mobility and conductivity. | | | | Mobility and Conductivity. | 2 | 5 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the energy of electron distribution and the Fermi function | | | | Energy Distribution of Electrons, Fermi Level, Work Function | 2 | 6 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of semiconductors | | | | Introduction Semiconductors Materials ( Si , Ge and Compound Semiconductors ). | 2 | 7 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of grafted quasars and the Fermi level | | | | Extrinsic Semiconductors , Fermi – Level in Semiconductor | 2 | 8 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of diffusion, charge carriers, and the Hall effect | | | | Diffusion and Carrier Life Time , Hall Effect . | 2 | 9 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of current, voltage, and connection curves | | | | p-n Junction in Equilibrium , Current – Voltage Characteristics | 2 | 10 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of the transition zone in a diode | | | | Charge Control Description of a Diode Transition and Diffusion Capacitances , Diode Switching  Times. | 2 | 11 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of the diode and the small signal model | | | | Diode Models , Small – Signal Model and Load Line Concept. | 2 | 12 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the types of diodes | | | | Varactor Diode, Tunnel Diode, Photodiode and Photovoltaic (Solar) Cell, Light – Emitting Diode. | 2 | 13 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to how to deal with semiconductor lasers | | | | Principle and Operation of Semiconductor Laser. Electronic Ballistics Semiconductor Diode | 2 | 14 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the half-wave and full-wave rectifier | | | | Half wave and Full wave rectifier ,clipping and clamping circuit. | 2 | 15 |
| 1. **Course Evaluation** | | | | | | | | |
| Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc. | | | | | | | | |
| 1. **Learning and teaching resources** | | | | | | | | |
| Introduction to physical Electronics By: Bill Wilson | | | | | Required textbooks (methodology, if any) | | | |
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|  | | | | | Recommended supporting books and references (scientific journals, reports....) | | | |
| https://www..edouniversity.edu.ng/oer/lecturenotes/electricalelectronic-engineering | | | | | Electronic references, Internet sites | | | |