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| **Subject Code: (BEC-105)** | **Introduction to Electronics Engineering** |
| Course category | : Engineering Fundamentals (EF) |
| Pre-requisite Subject | : Nil |
| Contact hours/week | : Lecture: 2, Tutorial: 0, Practical: 0 |
| Number of Credits | : 2 |
| Course Assessment  methods | : Continuous assessment through tutorials, attendance, home assignments, quizzes, viva voce and minor and major theory Examination |
| Course Outcomes | : The students are expected to be able to demonstrate the following knowledge, skills, and attitudes after completing this course. |
| 1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, semiconductor sensors, BJT, JFET and MOSFET etc. 2. Able to understand the working principles of electronic circuits e.g., Rectifiers, Clipper, Clamper, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits. 3. Able to understand the functioning and purposes of Measuring equipment such as multimeter, CROs and function generator sets. 4. Able to rig up and test small electronics circuits. | |
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| Topics Covered | |
| UNIT-I 6 | |
| Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, Intrinsic and extrinsic semiconductors, p-n junction diode, V-I characteristics of p-n junction diode, Shockley equation of diode. Diode Applications in rectifier, clipper, and clamper circuits. Breakdown mechanism and characteristics (Zener and avalanche), Zener diode application. | |
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| UNIT-II 6 | |
| Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors, comparison of biasing circuits, Concept of early effect, Ebers-Moll model. Applications of BJT as an amplifier and switch, Graphical analysis of CE amplifier, concept of voltage gain, current gain, h- parameter model (low frequency). | |
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| UNIT-III 6 | |
| JFET: Basic construction, transistor action, concept of pinch off, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed & self-biasing. MOSFET: depletion and enhancement type MOSFET-construction, operation, and characteristics. Concept and applications of CMOS circuits. | |
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| UNIT-IV 6 | |
| Basics of semiconductor sensors and integrated circuits (IC). Operational Amplifiers: Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators. Electronics Instruments: Working principle of digital voltmeter, digital multimeter, cathode ray oscilloscope (CRO). | |

**List of Books:**

1. Robert L. Boylestand / Louis Nashelsky “Electronic Devices and Circuit Theory”, Latest Edition, Pearson Education.
2. H S Kalsi, “Electronic Instrumentation”, Latest Edition, TMH Publication.
3. George Kennedy, “Electronic Communication Systems”, Latest Edition, TMH.
4. David A. Bell, “Electronic Devices and Circuits”, Latest Edition, Oxford University Press.
5. Jacob Millman, C.C. Halkias, Staya brataJit, “Electronic Devices and Circuits”, Latest Edition, TMH.
6. David A. Bell, Electronic Instrumentation and Measurements, Latest Edition, Oxford University Press India.