

Course Title	Basic Electronics (Natural Science)
Course Code	NPHY-130
Credit Hours	CH3
Learning outcomes	Course is designed to introduce fundamental principles of circuit theory and electronic
Contents	<p>Fundamental Solid-State Principles: Atomic theory, Metals, insulators and semiconductors. Conduction in Silicon and Germanium, doping, The forbidden energy gap, N and P type semiconductors.</p> <p>The Semiconductor Diode: Introduction to PN junction diode, Bias, the ideal diode, the practical diode model, other practical considerations, the complete diode model, voltage-current characteristics. Common Diode applications: Transformers and power supply, Half-wave rectifiers, full-wave rectifiers, full-wave Bridge rectifiers, wave shaping circuits using diodes, voltage multiplier circuits.</p> <p>Special applications Diodes: Zener diodes, light emitting diodes, photodiodes, capacitance effect in the PN junction, other diodes. Circuit analysis: DC circuit analysis, single and multi-loop circuits, Kirchhoff's rules, RC circuits, Charging and discharging of a capacitor, RL circuits, AC circuit analysis using the j-operator, RLC circuits, superposition theorem, Thevenin's theorem, Norton's theorem, the hybrid parameter equivalent model, graphical depiction of hybrid parameters, variation of transistor parameters.</p> <p>Bipolar Junction Transistors: Introduction to Bipolar Junction Transistors (BJTs), transistor construction and operation, transistor characteristics curves, concept of load line. Bipolar Junction Transistors applications: Transistor as an amplifier, basic transistor configurations, transistor as a switch, concept of decibels, Feedback principle and circuits</p>
Teaching-learning Strategies	Classroom teaching / Lecturing
Assignments-Types and Number	Problem sheet: 3-4
Assessment and Examinations	<p>Mid-Term Assessment: 35%</p> <p>Formative Assessment: (25%): It includes classroom participation, attendance, assignments and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.</p> <p>Final Term Assessment: 40%</p>
Text Books	<ol style="list-style-type: none"> 1. Introductory Electronic Devices and Circuits, by R. T. Paynter, Prentice Hall, 7th edition, (2005). 2. Introductory Electric Circuits, by R. T. Paynter, Prentice Hall, (1998). 3. Electronic Devices, by T. L. Floyd, Pearson, 10th Edition, (2017) 4. Grob's Basic Electronics, by M. E Schultz, McGraw-Hill Education, 12th edition, (2015) 5. Introductory Circuit Analysis, by R. L. Boylestad, Pearson, 13th Edition, (2015) 6. Electronic Principles, by A. P. Malvino, David J. Bates, McGraw-Hill, 8th Edition, (2015)

