

Course Title	ELECTORNICS-I
Course Code	MPHY-371
Credit Hours	CH3
Pre- requisites	FSc / A-Level (Physics) or equivalent
Learning outcomes	To make students acquire a basic knowledge in solid state electronics including diodes, BJT, etc.
Contents	The Semiconductor Diode: P-type, N-type semiconductors, the junction diode (biasing and characteristics), Diode as rectifier and switch: The ideal diode model, the half wave rectifier, the full wave rectifier, bridge rectifier, measurement of ripple factor, the capacitor filter, the π filter, the π-R filter, diode wave shaping circuits (clippers and clampers). Special Diodes: Zener Diode, Light Emitting Diode, Photodiode, Tunnel Diode, Shockley Diode, Other diodes, Circuit Theory and Analysis: Models for circuit, one-port and two-port networks, network theorems, hybrid parameters and equivalent circuit, Power in decibels, The Junction Transistor as an Amplifier: Transistor voltage and current designations, the junction transistors, the volt-ampere curve of a transistor, the current amplification factors, the load line and Q point, the common emitter amplifier, the trans-conductance g_m, performance of a CE amplifier, relation between A_i and A_v, the CB amplifier, the CC amplifier, comparison of amplifier performance, DC Bias for the Transistor: Choice of Q point, variation of Q point, fixed transistor bias, the four resistor bias circuit, design of a voltage feedback bias circuit, Common emitter, common collector, common base biasing, Field Effect Transistor: introduction to field effect transistor (FET), Junction field effect transistor (JFET): operation and static characteristics. Metal oxide semiconductor Field Effect Transistor (MOSFET), operation in enhancement and depletion modes. FET configurations and biasing: Common drain, common source and common gate, load line, fixed bias, self-bias and voltage-divider bias.
Teaching-learning Strategies	Classroom teaching / Lecturing
Assignments- Types and Number	Problem sheet: 3-4
Assessment and Examinations	Mid-Term Assessment: 35% Formative Assessment: (25%): It includes classroom participation, attendance, assignments and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc. Final Term Assessment: 40%
Text Books	1. Electronic Devices, by T. L. Floyd, Pearson, (10th Edition), (2017). 2. Fundamentals: Circuits, Devices and Applications, by T. L. Floyd, D. M. Buchla, Prentice Hall, (8th Edition), (2009). 3. Electronic Principles, by A. P. Malvino, D. J. Bates, McGraw-Hill, (8th Edition), (2015). 4. Solid State Electronic Devices, by B. Streetman and S. K. Banerjee, Pearson, (7th Ed), (2015) 5. Grob's Basic Electronics, by M. E Schultz, McGraw-Hill, (12th Edition) (2015) 6. Electronic Devices and Circuit Theory, by R. L. Boylestad, L. Nashelsky, Pearson, (11th Edition), (2012)