

Part A: Introduction			
Program: Degree Course		Class: B.Sc.	Semester: Third Session: 2023-2024
1	Course Code	PSE – 01T	
2	Course Title	Analogue Circuits and Instrumentation	
3	Course Type	Theory	
4	Pre-requisite (if any)	As per norms	
5	Course Learning Outcomes (CLO)	After completion of the course students will be able to: <ul style="list-style-type: none">• Understand the basic principles and industrial applications of semiconductor diode, Zener diode and transistor• Understand the construction working and applications of transistor• Gain the knowledge of analogue and digital circuits• Understand the construction and working principles of various instruments that are used in the physics laboratory• Develop interest in electronic components	
6	Credit Value	Theory : 4 Theory : 4 (Th-3 + Tutorial-1)	
7	Total Marks	Max. Marks: 100	Min Passing Marks : 40
Part B: Content of the Course			
Total Hours: 60			
Unit	Topic		Number of Hours
I	Semiconductor Devices and Amplifiers: p and n type semiconductors. Semiconductor Diodes: Barrier Formation in PN Junction Diode. Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode, PN junction and its characteristics, Principle and structure of (1) LEDs (2) Photodiode (3) Solar Cell.		15
II	Power Supply: Half-wave Rectifier, Central-tapped and Bridge Full-wave Rectifiers, Calculation of Ripple Factor and Rectification Efficiency, Basic idea about capacitor filter, L-section filter and π -section filter, Zener diode as voltage regulator. Bipolar Junction transistors: n-p-n and p-n-p Transistors. Characteristics of CB, CE and CC Configurations. Active, Cutoff, and Saturation Regions. Current gains α , β and γ . Relations between α , β and γ . Load Line analysis of Transistors. DC Load line and Q-point.		15
III	Voltage Divider Bias Circuit for CE Amplifier. h-parameter Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output impedance. Current, Voltage and Power Gains. Construction, Working and Characteristics of Junction Field Effect Transistor, and MOSFET.		15
IV	Sinusoidal Oscillator: Barkhausen's criterion for Self-sustained oscillations, Determination of frequency of Wein Bridge Oscillator, Hartley oscillator and Phase shift oscillator Introduction to CRO: Block diagram, construction and working of each part of CRO, Applications of CRO in (i) study of waveform (ii) measurement of voltage, current, frequency and phase difference.		15