	PVKN Govt. College (Autonomous) Chittoor	**Program** II B.Sc. Electronics minor
Course Code 24-ELE-3C2	**TITLE OF THE THEORY PAPER** **SEMICONDUCTOR DEVICES AND MATERIALS**	**Semester-III**

Syllabus:

Unit I: (12 Hours)

Inorganic and Organic Semiconductor: Energy bands, carrier transport, mobility, drift diffusivity, excess carrier, injection and recombination of the excess carriers, carrier statistics; High field effects: velocity saturation, hot carriers and avalanche breakdown.

Unit II: (12 Hours)

Majority carrier Devices: MS contacts rectifier and non-rectifier, MIS structures, MESFET, hetero-junction, HEMT and band diagrams, I-V and C-V characteristics.

Unit III: (12 Hours)

MOS structures: Semiconductor surfaces; The ideal and non-ideal MOS capacitor band diagrams and CVs; Effects of oxide charges, defects and interface states. MOSFET: Structures and Device Characteristics, Short-Channel effects. Charge coupled Devices (CCDs), application to VLSI.

Unit IV: (12 Hours)

Non-volatile Memory Device. Optoelectronic Devices: solar cell, photo detectors, LEDs, Laser diodes. Nano structures and concepts: quantum wells, supper lattice structures, nanorod, quantum dot, CNTs, 2D materials: grapheme, BN, MoS2 etc, metamaterials.

UNIT-V: (12 Hours)

Multistage Amplifiers: ~~BJT at high frequencies~~, Frequency response of RC coupled amplifiers and transformer coupled amplifier**. Differences between RC coupled and Transformer coupled amplifier, Class – A, Class -B Amplifiers, advantages of Class – B amplifier over class- A amplifiers,**