	PVKN Govt. College (Autonomous) **Chittoor**	**Program** II B.Sc. Physics Hons.
Course Code **24-PHY-4C10**	**TITLE OF THE COURSE** **MODERN PHYSICS**	**Semester-IV**

Syllabus:

UNIT-I: Introduction to Atomic Structure and Spectroscopy: Bohr's model of the hydrogen atom -Drawbacks of Bohr atomic model, Derivation for radius, ~~energy and wave number~~ - Hydrogen spectrum, **Sommerfeld's relativistic model**, Vector atom model – Stern and Gerlach experiment, Quantum numbers associated with it, Coupling schemes, Spectral terms and spectral notations, Selection rules. Zeeman effect, Experimental arrangement to study Zeeman effect.

UNIT-II: Molecular Structure and Spectroscopy: Molecular rotational and vibrational spectra, **Rigid rotator, Hormonic oscillator** ~~electronic energy levels and electronic transitions,~~ Raman effect, Characteristics of Raman effect, Experimental arrangement to study Raman effect, Quantum theory of Raman effect, Applications of Raman effect. Spectroscopic techniques: ~~UV-Visible,~~ IR, and Raman spectroscopy.

UNIT-III: Matter waves & Uncertainty Principle: Matter waves, de Broglie's hypothesis, Properties of matter waves, Davisson and Germer's experiment, Heisenberg's uncertainty principle for position and momentum & energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit) and photons (Gamma ray microscope).

UNIT-IV: Quantum Mechanics: Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (one-dimensional potential box of infinite height (Infinite Potential Well)

UNIT-V: Superconductivity:
Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect, ~~London's Equation and Penetration Depth~~, Isotope effect, Type I and Type II superconductors, BCS theory, high Tc super conductors, Applications of superconductors