Lesson Plan

Name of the Assistant/ Associate Professor: - Mrs Nidhi Sharma

Class and Section: M.Sc. Physics 2nd Sem.

Subject: Quantum Mechanics Paper code: 18PHY22HC1

Week	Date	Topics
1	1st March-7th March	**Unit I:**
		Time Independent perturbation theory: Meaning of perturbation
		Non-degenerate perturbation theory
		Harmonic oscillator subjected to different perturbation: x, x2, x and x
		Degenerate perturbation theory: two and g fold cases
		The Stark effect
		The Fine structure of hydrogen
2	7th March-14th March	Zeeman Effect
		Normal and Anomalous
		Variational Principle
		Ground state of He-atom by both perturbation and varitional method
		Estimation of ground state energy of hydrogen molecule by perturbation method
		WKB approximation: General formulism validity
3	15th March-21th March	Bound states of Potential wells with no one and two rigid walls
		Tunneling trough a barrier
		Time dependent perturbation theory: Transition probability
		Transition probability for constant and harmonic perturbations
		Adiabatic and sudden approximation
		Interaction of atoms with radiation: classical treatment of incident radiation
		Quantization of E.M. field
		Transition rates for absorption and emission of radiation
4 Week	29th March-4th April	Electric Dipole Approximation
		Transition rates within dipole approximation
		Selection rules for electric dipole transitions

		Magnetic quantum numbers
		Angular momentum quantum numbers
		Spontaneous emission: Einstein A and B coefficients
5	5th April-11th April	Life time and Line width
		Scattering and cross-section
		Connection between scattering angle in Lab and CM frames
		Connecting the Lab and CM cross sections
		Scattering amplitude spineless particles
		Scattering amplitude and differential cross sections
6		Solution of Schrödinger equation for scattering problem
		Born approximation and its validity
		Partial wave analysis
		Partial wave analysis for elastic and inelastic scattering,
	12th April-18th April	Scattering from a square well potential and Hard sphere potential
7		Many particle systems: Schrodinger equation
		Interchange symmetry
		System of distinguishable identical particles
		System of identical particles: identical particles in classical and quantum mechanics
	19th April-25th April	Exchange symmetry
8		Symmetrization postulate
		Constructing symmetric and anti- symmetric wave functions
		System identical non interacting particles
		Wave function of two particles
		Three particle and many particle systems
	26th April-2nd May	Pauli's exclusion principle and Slater's determinant
9	3rd May-9th May	Spin states of a two electron system, **Test and Assignments**