

2000-2001

## SYLLABUS

ANDHRA UNIVERSITY  
DEPARTMENT OF PHYSICS  
II M.Sc. PHYSICS & II M.Sc.(Tech.) ELECTRONICS.  
III SEMESTER  
P301: QUANTUM MECHANICS -II

SSP-5-301

### UNIT -I

1. **Linear Vector Spaces in Quantum Mechanics:**

Vectors and operators, change of basis, Dirac's bra and ket notations. Eigen value problem for operators. The continuous spectrum. Application to wave mechanics in one dimension.

(Merzbacher Sec. 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7)

2. **Quantum Dynamics :**

The equation of motion, Quantization postulates, canonical quantization, Constants of motion and invariance properties. Heisenberg picture. Harmonic Oscillator.

(Merzbacher . Sec. 15.1, 15.2, 15.3, 15.4, 15.6, 15.7)

3. **Euclidean principles of relativity and state vector transformations. Rotation operator and angular momentum. Representations of rotation group.**

(Merzbacher. Sec. 16.1, 16.2, 16.5)

### UNIT - II

1. **Development of time-dependent perturbation theory. The golden rule for constant transition rates.**

(Merzbacher. Chapter. 13 relevant parts)

2. **Addition of two angular momenta. Tensor operators.**

Wigner-Eckart theorem, Matrix elements of vector operators. Parity and time reversal symmetries.

(Merzbacher . Section, 16.6, 16.8, 16.10, 16.11)

3. **Scattering:**

Concept of differential cross-section. Scattering of a wave packet. Born approximation. Partial waves and phase shift analysis.

(Merzbacher. Section. 11.1, 11.2, 11.4, 11.5)

### TEXT BOOKS:

"Quantum Mechanics " by E. Merzbacher (John Wiley & Sons, Inc., New York)