Phys 4302	**QUANTUM MECHANICS-II**	**(CR3)**
Preq.	**Phys 3301/ ADP (Physics)**	

Objectives
The second course provides a basis for further concepts of quantum mechanics.

Syllabus

Elements of Matrix Mechanics, matrix representation, Identical particles, many particle systems, and second quantization: indistinguishability of identical particles, systems of identical particles, quantum dynamics of identical particle systems, angular momenta and spin *1/2* boson operators, exchange degeneracy, symmetrization postulates, constructing symmetric and anti-symmetric wavefunctions, system of identical noninteracting particles, Exclusion principle approximate methods for stationary states, time independent perturbation theory for non degenerate levels and for degenerate levels, fine structure and anamolous Zeeman effect, the variational method, the WKB approximation, bound states for potential well with no rigid wall, bound states for potential well with one rigid wall, tunneling with potential barrier, time dependent perturbation theory, pictures of quantum mechanics, Schrodinger, Heisenberg and interaction picture, transition probability and Fermi Golden Rule, interaction of atoms with radiation, the theory of scattering, scattering experiments and cross sections, scattering amplitudes, potential scattering, the method of partial waves, the Bom approximation.

Recommended Books

1. *Introduction to Quantum Mechanics by D. J. Griffiths and D. F. Schroeter(3rd Ed),Cambridge, (2018)*
2. *Introductory Quantum Mechanics by R. Liboff (4th Edition), Addison-Wesley (2002)*
3. *Quantum Mechanics: Concepts and Applications by N. Zettili (2nd Edition), Wiley (2009)*
4. *Modern Quantum Mechanics by J. J. Sakuri and Jim J. Napolitano (2nd Edition), Pearson (2010).*
5. *An Introduction Quantum Mechanics by W. Greiner, Addison Wesley (1980).*