Phys 4306	RELATIVISTIC QUANTUM MECHANICS	(CR3)
Preq.	Phys 3301/ ADP (Physics)	

Objectives

To provides an understanding of the effects of special relativity in quantum mechanics.

Syllabus

The Klein-Gordan Equation, Non relativistic quantum mechanics, Lorentz covariance and 4 vector notation, the Klein Gordon equation, the Feynman-Stuckelberg interpretation of $E < 0$ solutions, non relativistic perturbation theory (brief review), rules for scattering amplitudes in the Feynman-Stukelberg approach, the Dirac Equation: Covariant form of the Dirac Equation, Dirac γ-matrices, conserved current and the adjoint equation, free particle spinors, anti particles, normalization of spinors and the completeness relations, bilinear covariants, zero mass fermion, Weyl and Majorana spinors, Weyl equation, Weyl and Majorana representation of the Dirac equation, the two-component neutrino, V-A interaction, Fermi interaction, unitary and anti-unitary symmetries, CPT symmetries, Dirac particles in external fields, brief introduction to QED: Feynman Rules in QED, Invariant amplitude, Invariant variables.

Recommended Books

1. *Quarks and Leptons by F. Halzen, and A. D. Martin, Wiley, (1984).*

2. *Introduction to Elementary Particles by Griffiths, D., 2nd Edition, Wiley, (2008).*
3. *Relatvistic Quantum Mechanics by J. D. Bjorken, and S. D. Drell, McGraw-Hill, (1964)*
4. *Quantum Mechanics by Riazuddin and Fayyazuddin, World Scientific(1990).*