

BS (4 Years) for Affiliated Colleges



Code	Subject Title	Cr. Hrs	Semester
PHY-428	PARTICLE PHYSICS-IV	3	VIII
Year	Discipline		
4	Physics		

Course Outlines:

Electrodynamics of spinless particles: An “electron” in an electromagnetic field A^μ , “spinless” electron – muon scattering, the cross section in terms of the invariant amplitude M , the decay rate in terms of M , “spinless” electron – electron scattering, electron – positron scattering: and application of crossing, invariant variables, the origin of the propagator.

Electrodynamics of Spin $\frac{1}{2}$ Particles: An electron interacting with an electromagnetic field A^μ , Moller scattering $e^- e^- \rightarrow e^- e^-$, the process $e^- \mu^- \rightarrow e^- \mu^-$, trace theorems and properties of γ matrices, $e^- \mu^-$ scattering and the process $e^+ e^- \mu^+ \mu^-$, helicity conservation at high energies, survey of $e^+ e^- \rightarrow e^+ e^-$, $\mu^+ \mu^-$, $e^- \mu^- \rightarrow e^- \mu^-$ in the laboratory frame; kinematics relevant to the parton model, photons, polarization vectors, more on propagators, the electron propagator, the photon propagator, massive vector particles, real and virtual photons, Compton scattering $\gamma e^- \rightarrow \gamma e^-$, pair annihilation $e^+ e^- \rightarrow \gamma\gamma$, the + is prescription for propagators, Feynman rules QED.

Books Recommended:

1. *Relativistic Quantum Mechanics* by Bjorken, J. D. and Drell, S. D., McGraw-Hill, (1964) International Edition reprinted in (1995).
2. *Quarks and Leptons* by Halzen, F. and Martin, A.D., John-Wiley and Sons (1984).
3. *Quantum Mechanics* by Riazuddin and Fayyazuddin, World Scientific, (1990).
4. *Introduction to Elementary Particles* by Griffiths, D., John-Wiley and Sons, (1987).