

Indian Institute of Technology Kanpur

Department of Physics

Semester: 2021–22-II

PHY 680A: Particle Physics

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Course Prerequisite: PHY 681A (Quantum Field Theory I); Group Theory.

Course Syllabus: Broad topics that will be covered in this course are as follows.

- ◇ Preview of particle physics.
- ◇ Historical developments.
- ◇ Elements of the Standard Model of particle physics.
 - ▷ Deep inelastic scattering and the Quark Parton model.
 - ▷ Fermi theory of weak interactions.
 - ▷ Standard Model as gauge theory.
 - ▷ Spontaneously broken symmetry and the Higgs mechanism.
- ◇ Standard electroweak model with leptons.
- ◇ Electroweak interactions of Hadrons.
- ◇ Electroweak gauge bosons.
- ◇ Shortcomings of the Electroweak theory¹ – beyond the Standard Model of particle physics.

References: No textbook will be strictly followed. Below-listed books will be useful for the contents of the course:

1. Quarks and Leptons, F. Halzen and A. D. Martin, John Wiley and Sons.
2. Gauge Theory of Elementary Particles, T.-P. Cheng and L.-F. Li, Oxford University Press.
3. Gauge Theories in Particle Physics (Volume 1 & 2), I. J. R. Aitchison and A. J. G. Hey, Institute of Physics Publishing.

¹time permitting