

# First Handout for PHY-680/680A: Particle Physics

**Instructor: Kaushik Bhattacharya<sup>1</sup>**

**Office: FB-387, Phone: 7306**

The course is designed according to the syllabus set by the Institute. Throughout the course the emphasis will be on the inherent symmetries in nature as parity, charge-conjugation and time-reversal. More over we will try to focus our attention on global as well as local gauge symmetries which dictates much of the nature of particle physics. The subject will be built up by referreing to, and interpreting the results, of the various pathbreaking experiments which shaped the history of modern particle physics. The course will end with a brief encounter with the standard model of particle physics. I will assume that the students have an understanding of the following:

- special theory of relativity.
- Very basics of quantum field theory.
- Some amount of group theory.

People who are not aware of these topics are requested to go through them once such that they can understand the class proceedings. The very basic books they can consider to brush up their basics are as follows.

- **Introduction to Elementary Particles**, by David Griffiths.
- **A First Book of Quantum Field Theory**, by Amitabha Lahiri and Palash Baran Pal.

As particle physics requires a moderately fair amount of knowledge of special relativity and group theory the students are advised to look up to these topics before the actual classes start.

The grading pattern for the course is as follows:

1. First quiz 10 marks.
2. Midsem examination will have 80 marks.
3. Second quiz will have 10 marks.
4. Final examination will have 100 marks.

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<sup>1</sup>Email: kaushikb@iitk.ac.in

There will be homeworks given in the class which the students are supposed to solve. If they find any difficulty with the problems they can always meet the instructor at any convenient time. Some of the problems in the exams will come from the homeworks.

The students are required to attend each and every class of the course, as missing some of them will become a heavy burden at the time of examinations. The books which can be consulted:

1. **Quarks and Leptons**, by F. Halzen and D. Martin.
2. **Gauge Theory of elementary particle physics**, by Ta-Pei Cheng and Ling-Fong Li.
3. **An Introduction to Quantum Field Theory**, by Michael E. Peskin and Daniel V. Schroeder.

These are only some books out of many good books. The students are free to consult any book of his/her choice. The main course may or may not follow any of the particular books, listed above, in great detail but the above set of books offers a comprehensive understanding of the topics which will be covered in the particle physics course.