Standard Model : Phys 629

1 Course Outline:

Course: Standard Model
Instructor: Dr Alakabha Datta
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Meeting: MWF 1 pm to 1.50 pm at Lewis 104
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2 Books

We do not have a prescribed book for this course. A lot of the material will be from Quantum Field Theory by Mandl and Shaw used in Quantum Field Theory 1. Other books that will be used are:

- The Standard Model A Primer by Cliff Burgess and Guy Moore.

- Gauge Theories of the Strong, Weak and the Electromagnetic Interactions by Chris Quigg.

3 Topics Covered will be taken from the list below:

- Review of basic Lie Groups and Algebras used in SM like $SU(2)$ and $SU(3)$.

- Introduction to Gauge symmetries and Gauge Theories: Yang-Mills Theories.

- Introduction to Spontaneous Symmetry Breaking (SSB) Goldstone Bosons and the Higgs Mechanism.

- The Lagrangian of the Standard Model (SM).

- Phenomenology of the SM: Z, W and H Decays.

- Weak Decays of the leptons.

- Scattering of Leptons.

- Ideas of Renormalization and running coupling constants.

- Introduction to strong Interactions.

- Weak Decays involving quarks: The CKM mixing.

- Neutrino mixing and masses.

- Brief description of beyond the SM Theories.

4 Marking

- Homework: 55 % .

- Mid Term Report: 20%.

- Final Take Home Exam: 25% .

An overall course average of the following percentages will guarantee the corresponding letter grade:

90%	A
80%	B
70%	C
60%	D

5 Academic Integrity:

We will follow the University?s policy of academic integrity (M-book). Violations of these policies will result in a failing grade and other disciplinary actions.