Birla Institute of Technology & Science, Pilani
Hyderabad Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2019-2020
Course Handout Part II

Date: 07-08-2019

Course Number : PHY F425
Course Title : Advanced Mathematics
Instructor-in-charge : Prasant Samantray

Scope and Objective of the Course: The course offers an introduction to the mathematical foundations of modern quantum field theory. The emphasis is on developing the functional methods for understanding the structure of scattering amplitudes in non-abelian SU(N) gauge theories.

Textbooks:

1. Michael Peskin and Daniel Schroeder : An introduction to Quantum Field theory

Reference books

1. Anthony Zee : Quantum Field Theory in a Nutshell

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter(s) in the Text Book
1	Overview	The need for QFT	
2-10	Functional Methods	The Functional Integral and Scalar QED	9
11-20	The Renormalization Group	Beta Functions in scalar QED, Yukawa Theory	12
21-30	Non-Abelian Gauge Theories	SU(2) and SU(3) gauge theories, Non-abelian charge	16
31-40	Quantum Chromodynamics	Asymptotic Freedom and Two loop renormalization relations	17
41-42	Summary	Closing remarks and challenges ahead	

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Mid term Seminar	30 minutes	40	28-09-2019; 10 am	PPT
Project Report and End term Seminar	Seminar Presentation 45 minutes	20 + 40	01-12-2019, 10 am	PPT

Chamber Consultation Hour: 2-3pm Thursday

Notices: On CMS and Physics department notice board

Make-up Policy: Make up will be given only against the application forwarded by chief warden. No make up requests after completion of examination will be entertained.

INSTRUCTOR-IN-CHARGE