BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE – PILANI, HYDERABAD CAMPUS
FIRST SEMESTER 2023 - 2024
COURSE HANDOUT

Date:11-08-2023

In addition to part I (General handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course Number	:	PHY F212, ECE F212, EEE F212, INSTR F212
Course Title	:	Electromagnetic Theory I
Instructor-in-Charge	:	Sashideep Gutti
Instructors	:	Sashideep Gutti, Subhash Karbelkar, Rahul Nigam, KVS Shiv Chaitanya, Swastik Bhattacharya, V Satya Narayana Murthy

Scope & Objective of the course:

Electromagnetic theory forms an important ingredient, along with the quantum theory, of the physics behind the technology we use and design today. Building on the electromagnetic theory, studied in the XII standard, this course augments students' understanding of electromagnetic fields to a level from where they can take up advanced learning in this field. Students are strongly advised to revise what they have learnt in XII using the textbook as it may lead to deeper/newer insights.

Text Book: *Introduction to Electrodynamics*, David J. Griffiths, Fourth Edition, Pearson Education Inc., 2017 reprint..

Reference Books:

1. *The Feynman Lectures on Physics: Volume II*, Richard P. Feynman, Robert B. Leighton, Matthew Sands, The New Millennium Edition, Pearson Education Inc. 2013.

Learning Outcomes:

1. Ability to evaluate the Gradient, Curl and Divergence of Scalar and Vector Fields in Cartesian Coordinates, Cylindrical Polar Coordinates and Spherical Polar Coordinates.
2. Ability to deal with the Electric and Magnetic fields in space as well as in matter in static as well as time variable situations.
3. Ability to apply Maxwell's equations to a given problem.

COURSE HANDOUT

Lecture Number	Learning Objectives	Topics to be covered	Reference Chapter/ Section
1	Electromagnetism Introduction	Introduction to EMT 1	CLASS LECTURE
2-11	Vector Analysis	Vector differential and integral calculus; Gradient, Curvilinear co-ordinates (cylindrical, spherical and cartesian),	1.2-1.5(A BRIEF DISCUSSI

		Theorem of curl, divergence and gradient, Dirac Delta Function, Helmholtz theorem and potentials	ON OF 1.6
12-18	Electrostatics	Divergence and curl of electrostatic fields; electric potential, work and energy in electrostatics	2.2-2.5 (BRIEF RECAP OF 2.1 AND 2.5.4)
19-21	Some special mathematical techniques	Method of images, Multipole expansion	3.2 and 3.4 (Exclude 3.3)
22-26	Electric Fields in Matter	Polarization, bound charges, electric displacement, Linear dielectrics	4.1 - 4.4
27-31	Magneto statics	Divergence and curl of B Magnetic vector potential.	5.2 - 5.4
32-38	Electrodynamics	Maxwell's equations	7.1,7.2, 7.3.1 to 7.3.3
39-40	Electromagnetic Waves	EM waves in vacuum	9.2

Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage (%)	Date, Time	Remarks
1	Mid Sem Test	90 Min.	35	13/10 - 2.00 - 3.30PM	Closed Book
2	Quiz-1 *	50 Min.	20	TBA	Open Book
3	Quiz-2 *	50 min		TBA	Open Book
3	Comprehensive Exam	180 Min.	45	19/12 FN	Closed Book

***Quiz: Best one out of two quizzes. No make up**

Chamber Consultation Hour: To be announced later

Notices: Notices and solutions of Quizzes, Mid-Semester & Final Comprehensive Examination will be displayed on CMS.

Make-up Policy: In case of all pre-compre evaluation components, make up will be granted only on production of evidential documents with prior permission from the IC.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-Charge