Gyanmanjari Innovative University

Course Syllabus

Gyanmanjari Science College

Semester-1(B.Sc.)

Subject: Electricity and Magnetism 1- BSCPH11302

Type of course: Major

Prerequisite: Basic algebra & arithmetic. Idea of field lines, flux, area. Knowledge of semiconductors basics.

Rationale: This course has been designed to make the students know about basic principles of Physics. The students learn fundaments of physics understand the physics applications in real world and developing critical thinking skills. It helps students to develop problem-solving abilities and prepare them to shape career in advanced physics. Ultimately, pursuing a B.Sc. in Physics offers a combination of intellectual stimulation, practical skills, and versatile career opportunities. It equips you with a deep understanding of the physical world and provides a strong foundation for further education or a wide range of professional endeavors

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				SEE		CCE			
CI	T	P	C	Theory	Practical	MSE	LWA/V	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voice; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

3 Credits * 25 Marks = 75 Marks (each credit carries 25 Marks) Theory

1 Credits * 25 Marks = 25 Marks (each credit carries 25 Marks) Practical

SEE 100 Marks will be converted in to 50 Marks

CCE 100 Marks will be converted in to 50 Marks

It is compulsory to pass in each individual component.

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Report writing** Students have to Write a **case-study report** explaining working principle + type of magnetic material used and upload it to GMIU Web Portal.	10
2	Minor project Students prepare a working model based on any topic related to syllabus Prepare a small video on your project and upload it to GMIU Web Portal.	10
3	**Draw and explain** Students will draw a circuit and explain its working. Then upload in PDF format on GMIU web Portal (10 MCQs).	10
4	**Video Presentation** Student will prepare short video on the topic given by the faculty and upload on the GMIU web portal.	10
5	**Attendance** Student should present in class room during lecture.	10
	Total	50

Course Content:

Unit No	Course content	Hrs.	% Weightage
1	Chapter:1 A.C. Bridge and D C circuit A.C. Bridge: A.C bridge introduction and general bridge balance equation, Maxwell bridge, Owen's bridge, Anderson bridge, D C circuit: R.L circuit in series growth and decay, R.C circuit in series growth and decay, Series LCR circuit and its analysis and condition of oscillation. Quality factor. Example	10	25
2	Chapter: 2 Electricity Types of Galvanometer: (1) Moving iron Galvanometer (2) Electrodynamometer (3) Moving Coil Galvanometer: Ballistic and Dead Beat Galvanometer, Force of damping, Equation of Damped Simple Harmonic Oscillator for Ballistic and Dead beat galvanometer, Logarithmic decrement of Ballistic Galvanometer, Types of damping, Hall effect in conductor, Thomson Wattmeter, Examples,	10	25
3	Chapter: 3 Magnetism Classification of Magnetic Materials: Diamagnetic, Paramagnetic, Ferromagnetic, Magnetic Permeability, Magnetic Properties of materials, Lange in's theory for diamagnetic materials(Classical). Weiss Theory of Para magnetism, Paramagnetic Susceptibility of a Solid Substances, Hysteresis loop for ferromagnetic substances. Ferromagnetic domains, Tangent law, Hard and Soft Magnetic Materials	12	25
4	Chapter: 4 Diode Circuits& Introduction to Transistor Diode Circuits: PN junction diode, Use of diodes in Rectifiers, The Half Wave Rectifier, The Full Wave Rectifier, The Bridge Rectifier, Definition of filter, Types of filters: Shunt capacitor filter, Series inductor filter Transistor: Transistor action, Transistor as an amplifier, CB,CE,CC connection and its Characteristics(Only Overview)	13	25

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (**Revised Bloom's Taxonomy**)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20 %	30%	30%	-	20%	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand the working principle of AC bridges.
CO2	Apply the concept of logarithmic decrement to determine damping constants in ballistic galvanometers.
CO3	Understand ferromagnetic domains and their influence on material behavior.
CO4	Apply theoretical knowledge to solve basic electronics problems and analyze simple circuits.

List of Practical

Sr. No	Descriptions	Unit No	Hrs.
1.	To determine Impedance of coil using series L-R ac circuit.	1	4
2.	To determine self-inductance of a given coil using Anderson bridge	1	2
3.	To study parallel resonance of L.C.R. circuit.	1	4
4.	To determine ratio of capacity of two capacitors using desauty bridge.	2	2
5.	To study magnetic field of coil using Stuart gee galvanometer	2	
6.	To determine resistivity of electrolyte using Koholaraus bridge	2	4
7.	To determine resistance of galvanometer and Leclance cell using P.O.Box Kelvin-Mens methods.	2	4
8.	To determine ratio of magnetic moments of two bar magnets using vibration magnetometer.	3	2
9.	To study bridge rectifier.	4	2
10.	To study PN junction diode forward characteristics.	4	2
		Total	**30**

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

References Books:

1) Electricity and Magnetism by D.N. Vasudeva
2) Electricity and Magnetism by R. Murugeshan
3) Nirav college physics
4) Electricity and Electronics by D.C. Tayal
5) Electric circuit analysis by Soni & Gupta
6) Principle of electronics by V.K. Mehta
7) Advanced practical physics by Chauhan and Singh
8) B.Sc. practical physics by C L Arora
9) Electricity and Magnetism by D.N.Vasudev
10) Advanced practical physics by Chauhan and Singh