هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification

(Bachelor)

Course Title:	**Electromagnetic Theory**
Course Code:	**PHYS26344**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**University of Bisha**
Version:	**3**
Last Revision Date:	25 July 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:	3

2. Course type					
A.	University ☐	College ☐	Department☒	Track☐	Others☐
B.	Required ☒	Elective☐			

3. Level/year at which this course is offered:	6th Level / 3rd year

4. Course general Description

This course deals primarily with a vector-calculus based on description of static electric fields in cases of fixed charges, conductors and dielectrics. The course covers Maxwell's equation, Lorentz-force law, conservation of charge and conservation of energy. In addition, the course will discuss potentials and wave equations. Additional topics include electrostatics and magnetostatics, motion of charged particles in electromagnetic fields, and propagation and generation of electromagnetic waves

5. Pre-requirements for this course:

PHYS26342 Electricity and Magnetism -2

6. Co- requirements for this course:

NA

7. Course Main Objective(s)

Recognize the fundamentals of electromagnetic theory.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the bases of vector analysis.	K.1	Lectures Solve problems	Written test Reports Homework Quizzes
1.2	Recognize the electrostatics.	K.1		
1.3	Recognize the magneto statics.	K.1		
1.4	Recognize the electrodynamics.	K.1		
2.0	Skills			
2.1	Solve problems related to the bases of vector analysis.	S.1	Lectures Solve problems.	Written test Reports Homework Quizzes
2.2	Solve problems related to the electrostatics.	S.1		
2.3	Solve problems related to the magneto statics.	S.1		
2.4	Solve problems related to the electrodynamics.	S.1		
3.0	Values, autonomy, and responsibility			
3.1	Exhibit self-learning skills independently.	V.2	Self-learning	Reports Presentation

C. Course Content

No	List of Topics	Contact Hours
1.	**Vector Analysis** **1. Differential Calculus** The Operator∇, the Gradient, the Divergence, and the Curl.	4.5
2.	**Vector Analysis** **2. Integral Calculus**	4.5

	Line, Surface, and Volume Integral.	
3.	**Electrostatics** **1. The Electric Field** Coulomb's Law The Electric Field Continuous Charge Distributions	4.5
4.	**Electrostatics** **2. Divergence and Curl of Electrostatic Fields** Field Lines, Flux, and Gauss's Law The Divergence of E Applications of Gauss's Law The Curl of E	4.5
5.	**Electrostatics** **3. Electric Potential** Introduction to Potential Poisson's Equation and Laplace's Equation The Potential of a Localized Charge Distribution	4.5
6.	**Magneto statics** **1. The Lorentz Force Law** Magnetic Fields Magnetic Forces Currents	4.5
7.	**Magneto statics** **2. The Divergence and Curl of B** Straight - Line Currents The Divergence and Curl of B Ampere's Law	4.5
8.	**Magneto statics** Comparison of Magneto statics and Electrostatics **3. Magnetic Vector Potential** The Vector Potential	4.5
9.	**Electrodynamics** **1. Electromotive Force** Ohm's Law Electromotive Force	4.5
10.	**Electrodynamics** **2. Electromagnetic Induction** Faraday's Law Energy in Magnetic Fields **3. Maxwell's Equations.**	4.5
Total		45

Table: The matrix of consistency between the content and the learning outcomes of the course.

	Course Learning Outcomes								
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1
Topic 1	✓				✓				✓
Topic 2	✓				✓				✓
Topic 3		✓				✓			✓
Topic 4		✓				✓			✓
Topic 5		✓				✓			✓
Topic 6			✓				✓		✓
Topic 7			✓				✓		✓
Topic 8			✓				✓		✓
Topic 9				✓				✓	✓
Topic 10				✓				✓	✓

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework, quizzes, reports, and presentation.	1: 15	10 %
2.	First term exam	7: 8	20 %
3.	Second term exam	12:13	20 %
4.	Final exam	End of Semester	50 %

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Introduction to Electrodynamics, David J. Griffiths, ٤rd edition, Upper Saddle River, New Jersey, (٢٠١٢).
Supportive References	- Engineering Electromagnetic, W. Hayt and J. Buck, 8th Ed., McGraw-Hill Higher, (2011).
Electronic Materials	- Blackboard. - PowerPoint presentations. - Digital library of University of Bisha https://ub.deepknowledge.io/Bisha
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities	Classrooms, Physics lab.
Technology equipment	Data show or smart board.
Other equipment	NA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Extent of achievement of course learning outcomes.	Teachers, students.	Direct (Final exams), Indirect (Questionnaire).
Effectiveness of teaching.	Teachers, students.	Indirect (Questionnaire)
Effectiveness of assessment.	Teachers, students.	Indirect (Questionnaire)
Quality of learning resources	Teachers, students.	Indirect (Questionnaire)
Quality of facilities available	Teachers, students.	Indirect (Questionnaire)
Fairness of evaluation	Peer reviewer.	Direct (Final exams reevaluation).

G. Specification Approval Data

COUNCIL /COMMITTEE	College of Science Council
REFERENCE NO.	20
DATE	**17 August 2023**