



**Third-Year of Bachelor of Science
Major Physics
Revised syllabus according to CBCS NEP - 2020**

Course Title: Electrodynamics

SEMESTER-V

W.E.F. 2025-2026

**RECOMMENDED BY THE BOARD OF STUDIES IN PHYSICS
AND
APPROVED BY THE ACADEMIC COUNCIL
Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and
Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal. Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India**

Academic Council Item No: 02/2025

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Physics
Name of the Class	:	Third Year
Semester	:	Five
Paper	:	III
No. of Credits	:	02
Title of the Course	:	Electrodynamics
Course Code	:	S303PHT
Name of the Vertical in adherence to NEP 2020	:	Major
Eligibility for Admission	:	
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	5.5
Pattern of Marks Distribution for SEE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2025-2026
Ordinances /Regulations (if any)	:	

Syllabus for Third Year of Bachelor of Science in Physics
(With effect from the academic year 2025-2026)

SEMESTER - V

Physics Paper – III

Course Title: Electrodynamics

No. of Credits – 02

Type of Vertical: Major

COURSE CODE: S303PHT

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to...

Course Learning Outcome No.	Course Learning Outcome
CLO-01	Understand core concepts from the theory of static electric and magnetic fields.
CLO-02	Understand the inter-relation of electric and magnetic fields
CLO-03	Derive the important relations in electromagnetic theory
CLO-04	Understand the electromagnetic concept of waves and their propagation
CLO-05	Solve theory based analytical problems related to electromagnetic theory
CLO-06	Solve numerical problems related to electromagnetic theory

Syllabus for Third Year of Bachelor of Science in Physics**(With effect from the academic year 2025-2026)****SEMESTER-V****Paper - Physics Paper – III****Course Title: Electrodynamics****No. of Credits – 02****Type of Vertical: Major****COURSE CODE: S303PHT**

COURSE CONTENT			
Module	Content	Credits	Lectures
1	Unit - I Coulomb & Gauss law, The divergence of E, Applications of Gauss' law, The curl of E. Introduction to potential, Comments on potential, The potential of a localized charge distribution. The work done to move a charge, Energy of a point and continuous charge distribution. Conductors, Basic properties, induced charges. Ref-- DJG: 2.1.1 to 2.5.2 Dielectrics, Induced Dipoles, Alignment of polar molecules, Polarization, Bound charges and their physical interpretation, Gauss' law in presence of dielectrics, A deceptive parallel, Susceptibility, Permittivity, Dielectric constant and relation between them, Energy in dielectric systems. Ref --- DJG: 4.1.1 to 4.4.3 (skip 4.4.2) Review of Biot-Savart's law and Ampere's law, Straight-line currents, The Divergence and Curl of B, Applications of Ampere's Law in the case of a long straight wire and a long solenoid, , Magnetic Vector Potential. Ref --- DJG: 5.1.1 to 5.4.2	01	15
2	Unit – II Magnetization, Bound currents and their physical interpretation, Ampere's law in magnetized materials, A deceptive parallel, Magnetic susceptibility and permeability, Energy in magnetic fields, Comparison of Electro & Magnetostatics Ref --- DJG: 6.1.1 to 6.4.1 Concept of EMF, Faraday's law in integral and differential form, Electrodynamics before Maxwell, Maxwell's correction to Ampere's law, Maxwell's equations, Magnetic charge, inductance, Maxwell's equations in matter. Ref --- DJG: 7.1.1 to 7.3.5 The continuity equation, Poynting's theorem, Newton's 3rd law, The wave equation for E and B, Monochromatic Plane waves, Energy, momentum and Poynting vector in EM waves, Propagation in linear media Ref --- DJG: 8.1.1 to 8.2.1, 9.1.1 to 9.2.3	01	15
	Total	02	30

References:

- **DJG:** Introduction to Electrodynamics by David J Griffith

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Access to the Course

The course is available for students admitted for Bachelor of Science.

Methods of Assessment

The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

Pattern of Evaluation

The Examination/Evaluation pattern shall be framed by the Board of Examination with its final approval from the Academic Council of the College.