



THIRD-YEAR OF BACHELOR OF SCIENCE MAJOR PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE: SPECIAL THEORY OF RELATIVITY

SEMESTER-VI

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	:	Six
Paper	:	III
No. of Credits	:	02
Title of the Course	:	Special theory of Relativity
Course Code	:	S312 PHT
Name of the Vertical in adherence to NEP 2020	:	Major
Eligibility for Admission	:	Any student admitted to Third year of B. Sc, degree programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra.
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-VI

Paper No – Physics Paper – III

Course Title: Special theory of Relativity

No. of Credits – 02

Type of Vertical: Major

Course Code: S312PHT

After successful completion of this course students will be able to

Course Learning Outcome No.	Course Learning Outcome
CLO-01	Remember the postulates of special relativity, Lorentz transformation equations etc.
CLO-02	Understand the transformation equations for: Space and time, velocity, frequency, mass, momentum
CLO-03	Understand the transformation equations for Electric and Magnetic Fields.
CLO-04	Solve the problems base on time dilatation, length contraction mass, momentum, energy.

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

Semester-VI

Paper No.– Physics Paper – III

Course Title: Special theory of Relativity

No. of Credits – 02

Type of Vertical: Major

Course Code: S312PHT

COURSE CONTENT			
Module	Content	Credits	No. of Lectures
1	Relativistic Kinematics - I: Postulates of the special theory of relativity, Concept of Simultaneity, Lorentz transformations and inverse transformations of space and time. consequences of the Lorentz transformation equations: length contraction, time dilation and meson experiment, The observer in relativity, Velocity addition formula and its consequences. Aberration and Doppler effect in relativity. Ref.: RR: 2 .1 to2. 8	01	15
2	Relativistic Dynamics: Concept of relativistic mass (omit derivation), Relativistic definition of momentum and force, Mass-Energy relation (concept and Derivation of $E= mc^2$ a), Relativistic kinetic energy, The Relativistic relation between energy and momentum. Ref.: RR: 3.1 to3.7 Transformation of Electric and Magnetic Fields: Introduction, The interdependence of Electric and Magnetic fields, The Transformation for E and B, The field of a uniformly moving point charge Ref.: RR: 4.1 to 4.4 Modern Applications: Role of special relativity in GPS technology, particle physics, and cosmology. (Online resource)	01	15
	Total	02	30

References:

1. RR: Introduction to Special Relativity: Robert Resnick (Wiley Student Edition).
2. <https://www.nasa.gov/image-article/einsteins-theory-of-relativity-critical-gps-seen-distant-stars>
3. <https://sathee.prutor.ai/article/physics/physics-special-theory-of-relativity>

Additional references

1. Special theory of Relativity: A. P. French.
2. Concepts of Modern Physics by Arthur Beiser.

Access to the Course

The course is available for all the 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.