



Dharampeth M. P. Deo Memorial Science College, Nagpur

Syllabus wise You Tube Links

B. Sc. SEM VI (Mathematics)

M-14: Special Theory of Relativity (Optional)

Unit I

Review of Newtonian Mechanics: Inertial frames, Speed of light and Galilean relativity, Relative character of space and time, Postulates of Special theory of relativity, Lorentz transformation equations and its geometrical interpretation, Group properties of Lorentz transformations.

<https://www.youtube.com/watch?v=DxRfoYTFzUY&list=PLhSp9OSVmeyLA34TA4c6d511eqh9SLXE0>

Unit II

Relativistic Kinematics: Composition of parallel velocities, Relativistic addition law for velocities, Transformation equation for components of velocities and acceleration of a particle, Transformation of Lorentz contraction factor, length contraction and time dilation.

<https://www.youtube.com/watch?v=DxRfoYTFzUY&list=PLhSp9OSVmeyLA34TA4c6d511eqh9SLXE0>

Unit-III

Geometrical representation of Space-Time: Four dimensional Minkowskian space-time of relativity, Space like and time like intervals, Proper time, Light cone or null cone World line of a particle, Four vector and tensors in Minkowskian space-time.

<https://www.youtube.com/watch?v=DxRfoYTFzUY&list=PLhSp9OSVmeyLA34TA4c6d511eqh9SLXE0>

Unit IV

Relativistic Mechanics and Electromagnetism: Variation of mass with velocity. Equivalence of mass and energy i.e., $E = mc^2$, Transformation equations for mass, momentum and energy. Relativistic force and transformation equations for its components. Relativistic Lagrangian and Hamiltonian. Maxwell's equation in vacuum, Propagation of electric and magnetic field strengths, Four potential, Transformation equations for electromagnetic four potential vector. Transformation equations for electric and magnetic field strengths.

<https://www.youtube.com/watch?v=DxRfoYTFzUY&list=PLhSp9OSVmeyLA34TA4c6d511eqh9SLXE0>



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