

## BS (4 Years) for Affiliated Colleges



Code	Subject Title	Cr. Hrs	Semester
<b>PHY-404</b>	<b>RELATIVITY AND COSMOLOGY</b>	<b>3</b>	<b>VII</b>
Year	Discipline		
<b>4</b>	<b>Physics</b>		

### Course Outlines:

Special Relativity, Galilean relativity, concept of ether, Michelson-Morley experiment, Einstein's postulates of special relativity, Lorentz transformations, structure of spacetime, Minkowski spacetime tensors, the light-cone, line element, four-vectors, relativity of simultaneity, time dilation, proper time, length contraction, twin paradox, velocity transformation and velocity addition. Relativistic Mechanics, Force equation in relativity, rest mass, kinetic and total energy, conservation of energy and momentum.

Elements of Tensor Calculus: Manifolds and coordinates, curves and surfaces, tensor fields, geodesics, Riemann tensor, metric tensor, Einstein's tensor.

General Relativity: Principles of general relativity, equation of geodesics deviation, Einstein's field equations.

Cosmology: Newtonian cosmology, cosmological redshift, Hubble's law, microwave background, the Big Bang, FRW metric.

### **Books Recommended:**

1. *Dynamics and Relativity*, by W. D. McComb, Oxford University Press, 1999.
2. *Introduction to Cosmology*, J. V. Narlikar, Cambridge University Press, 1989.
3. *Introducing Einstein's Relativity*, R. D'Inverno, Oxford University Press, 1992.