1   Maxwell equations and Galileo invariance.

2   The wave equation and the origin of the Lorentz group.

3   The Minkowski metric, the inverse Cauchy-Schwarz inequality, examples of Lorentz transformations.

4   Lorentz contraction, time dilation, the twin paradox.

5   Addition of velocities, Fizeau's experiment

6   Proper time, uniform acceleration, photons in special relativity.

7   Doppler effect, aberration of light.

8   Four-momentum conservation, decay of particles, Compton effect.

9   Introduction to tensor calculus: scalars, vectors, covectors, operations with tensors.

10   Covariant derivatives, the Levi-Civita connection, local inertial coordinates.

11   The curvature tensor and its properties.

12   The geodesic equation.

13   Basic principles of general relativity, Einstein equations, the energy-momentum tensor of dust.

14   Newtonian limit for the geodesic equations and for the Einstein field equations.

15   The Schwarzschild black hole.