ADVANCED GENERAL RELATIVITY

1- Mathematical background.
2- General formalism: (i) Lagrangian formulation. (ii) Causal structure and conformal diagrams.
3- Classical theory of black holes: (i) General analysis and theorems. (ii) Charged and rotating black holes.
4- Quantum fields in curved spacetime. Hawking radiation.
5- Black hole thermodynamics. Information paradox.
6- Basic notions in the quantum theory of gravity.
7- Relativistic cosmology. Causal structure of FRW universes.
8- Cosmological perturbation theory: formalism, transfer functions, CMB and matter density power spectra.
9- Inflation as the origin of primordial perturbations. Predictions and observations.