

# Topics To Know For the Mid-Term (Open Book and Note)

- The dark night sky.
- The cosmological principle.
- The expanding universe— how was it detected, what does it mean?
- Special relativity: length contraction and time dilation, and the speed of light.
- Minkowski diagrams: how to put different types of worldlines on them. Put moving frame within them.
- Relativity of simultaneity and causality.
- General relativity: how is it different from special relativity? The equivalence principle(s). Why do we need general relativity?
- Hubble time, Hubble length, age of the universe.
- The three different types of spacetime geometries that can describe the universe— how does the size of the universe evolve with time (past and future) in each of them?