Introduction to Astrophysics and Cosmology

---

1. Understand the different scales and orders of magnitude in astrophysics and cosmology, including mass, distances, and time.
2. Demonstrate the ability to work with celestial coordinates and times, and convert between different coordinate systems.
3. Calculate the luminosity, radius, and distance of a star using techniques such as stellar parallax, blackbody radiation, and color index.
4. Classify stars based on their spectral characteristics, using the physical basis provided by Boltzmann's equation and the Saha equation.
5. Explain the processes involved in stellar atmospheres, including radiation transfer, the formation of spectral lines, and the impact of the Eddington approximation.
6. Describe the structure of main sequence stars, the Virial theorem, stellar energy sources, and the process of nuclear burning in stars.
7. Analyze the theory of main sequence stars, including the homologous model, Eddington luminosity, radiative stability, and the evolution of low and high mass main sequence stars.