Angular Resolution of the Eye and Telescopes
   Dependence on Diffraction theory
   Astronomical “Seeing”
   S/N in astronomical detectors

Blackbody Radiation from Stars
   Wien's Law
   Stefan-Boltzmann Law
   Color Temperature, Flux and Luminosity

Parallax and Distance
Magnitude and Absolute Magnitude

Spectral Type
   Stellar surface Temperature
   Absorption Lines (conditions of formation)

Line Profiles
   Natural, Pressure, Thermal, Rotational

Binary Stars
   Spectroscopic binaries
   Masses from RV curves
   Sizes from Eclipse duration

Hertzprung-Russell Diagram
   Be able to plot it, with order of magnitude labels
   Know all the major features
   Explain the slope of the main sequence

Estimate the pressure at the center of the Sun

Apply the Virial Theorem to estimate the temperature deep in the Sun

Know the Proton-Proton Chain
**Formulae:**

**Hydrostatic Equilibrium**
\[
\frac{dP_r}{dr} = -\frac{G M \rho_r}{r^3}
\]

**Mass Distribution**
\[
\frac{dM_r}{dr} = 4\pi r^2 \rho_r
\]

**Magnitudes**
\[
m_1 - m_2 = -2.5 \log_{10} \frac{f_1}{f_2}
\]
\[
m - M = 5 \log_{10} D_{pc} - 5
\]

**Kepler’s Law**
\[
(M_A + M_B) \sin^3 i = \frac{P(v_A^{\text{obs}} + v_B^{\text{obs}})^3}{2\pi G}
\]
\[
(M_A + M_B) \sin^3 i = \frac{4\pi^2}{GP^2} (a_A \sin i + a_B \sin i)^3
\]