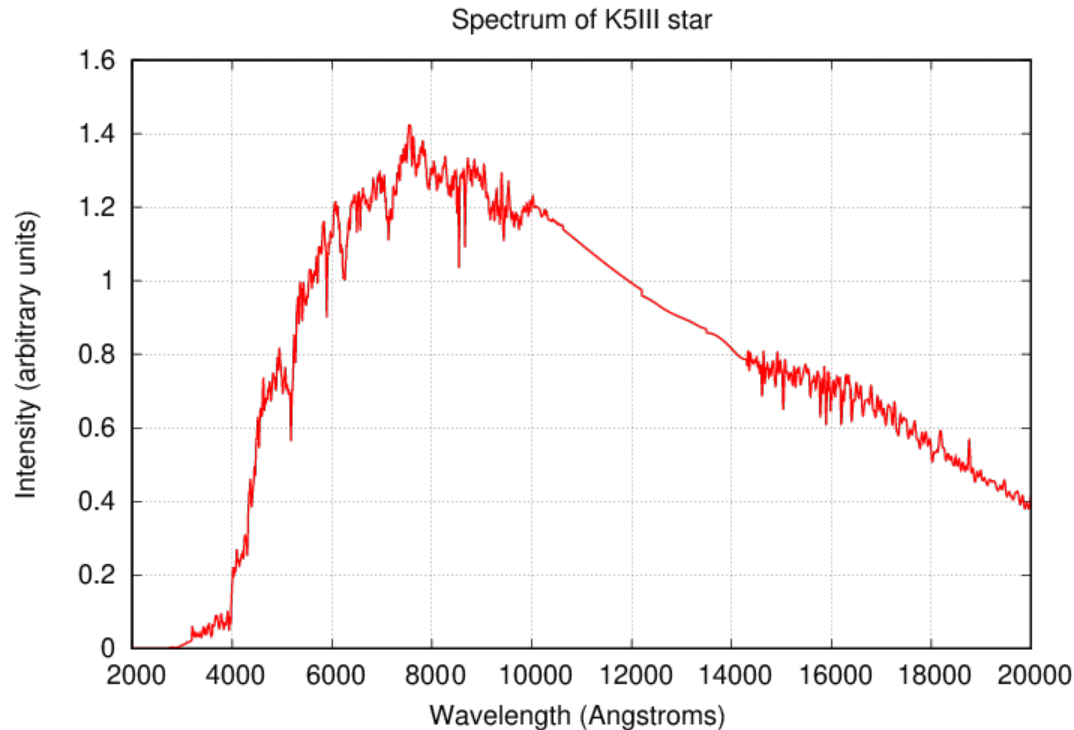Homework set 1, problem 3.

1. The star Eltanin has spectral type K5III.

2. The Pickles spectral library has an spectrum for K5III spectral type. Here's a graph showing the region near the optical and near-IR.

3. What is the wavelength at which this star's spectrum reaches its peak intensity? Any answer will be approximate, due to the noisiness of the spectrum, but my eyeball estimate is $\lambda_{peak} \sim$ **7500 Angstroms**.

4. Using Wien's Law and this peak wavelength, we can estimate the temperature of the star's photosphere to be **T $\sim$ 3866 K**.

5. The paper *The Radial Velocity Variability of the K-giant gamma Draconis: Stellar Variability Masquerading as a Planet* quotes several temperatures for this star's photosphere, based on other papers which study the the star:
   - 3990 K (McWilliam 1990)
   - 3990 K +/- 60 K (Prugniel et al. 2011)
   - 3990 K +/- 42 K (Koleva & Vazdekis 2012)

   My value is pretty close to these temperatures, good enough for an eyeball calculation.

6. **Bonus!** Below is a comparison of the stellar spectrum (in red) and a blackbody spectrum for an object of temperature T = 3866 K (in blue).

Spectrum of K5III star and blackbody