1 — Course Introduction [*Revision* : 1.4]

- Hand out course information sheets
- Census of students: name, major, year, courses taken (Math, Physics, Astro)
- Course motivation and outline
  - What is a star?
    - Gaseous sphere
    - Gravitationally bound
    - Emits radiation
    - Powered by nuclear fusion
    - Creates elements
    - Very distant — only measurable is radiation (EM, particles, gravitation)
  - Why study stars?
    - We study everything!
    - Tests many branches of physics
    - The Sun — a star that impacts life on Earth
    - Stars drive the evolution of galaxies
    - Stars provide most of visible mass in Universe
    - Stars trace the chemical evolution of the Universe (life...)
  - What will we need to learn?
    - Units (cgs units, magnitudes, astronomical units, parsecs)
    - Instrumentation (telescopes, spectrographs, photometers)
    - Classification systems (spectral types, HR diagram)
    - Self-gravitating systems
    - Interaction of light and matter (radiative transfer)
    - High-temperature physics (ionization, radiation pressure)
    - Energy transport processes
    - How stars are born, live and die
    - ... plus a lot of 'vanilla' physics (quantum, atomic, nuclear, kinetic theory, thermodynamics, statistical mechanics, EM, classical mechanics)
- Course divided into three sections:

I. Stellar Observations: what can we measure here on Earth?
   - Position
   - Distance
   - Velocity
   - Brightness
   - Spectrum
   - Variability
   - Non-EM radiation (gravitational, neutrino)

II. Stellar Atmospheres: what do the observations tell us about the stellar surface?
   - Temperature
   - Gravity

- (Indirectly) Mass, Luminosity, Radius
- Abundance

III. Stellar Interiors: what processes determine the interior structure, composition and evolution of stars?
- Balance between all four forces (gravitational, electromagnetic, strong/weak nuclear)
- Balance between energy sources (core) and leaks (surface)
- Change over time as energy sources are exhausted