### Astro 16 syllabus: Fall 2015

v.1 (11 Apr 2015)

<table>
<thead>
<tr>
<th>Topics</th>
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<tbody>
<tr>
<td>sketching the sky at dusk - including the Moon - and how it changes over a few days</td>
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<tr>
<td>viewing <em>Powers of Ten</em> and an assignment on the scale of the physical world</td>
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#### week 0  before classes start

- **class 1**  Tue, Sep 1
  - sky phenomenology: angles, motion, parallax

- **class 2**  Thu, Sep 3
  - inverse square law of light, blackbody spectrum, observational determination of properties of stars

#### week 1  class 1

- **class 1**  Tue, Sep 1
  - sky phenomenology: angles, motion, parallax

- **class 2**  Thu, Sep 3
  - inverse square law of light, blackbody spectrum, observational determination of properties of stars

- **class 3**  Tue, Sep 8
  - gravity, orbits, Kepler’s laws, virial theorem

- **class 4**  Thu, Sep 10
  - binary stars and stellar masses

#### week 2  class 5

- **class 5**  Tue, Sep 15
  - properties of the Sun and the Solar System

- **class 6**  Thu, Sep 17
  - nebular hypothesis and star/planet formation

- **class 7**  Tue, Sep 22
  - exoplanets: detection methods

- **class 8**  Thu, Sep 24
  - census of known exoplanet properties

#### week 3  class 9

- **class 9**  Tue, Sep 29
  - stellar properties, spectral types, luminosity class

- **class 10**  Thu, Oct 1
  - HR diagram

#### week 4  class 11

- **class 11**  Tue, Oct 6
  - how stars work: stellar structure

- **class 12**  Thu, Oct 8
  - midterm

#### fall break

#### week 7  class 13

- **class 13**  Tue, Oct 20
  - stellar energy generation

- **class 14**  Thu, Oct 22
  - stellar atmospheres and radiation transport

#### week 8  class 15

- **class 15**  Tue, Oct 27
  - stellar evolution

- **class 16**  Thu, Oct 29

#### week 9  class 17

- **class 17**  Tue, Nov 3
  - stellar end states: white dwarfs, neutron stars, black holes

- **class 18**  Thu, Nov 5

#### week 10  class 19

- **class 19**  Tue, Nov 10
  - interstellar gas and dust

- **class 20**  Thu, Nov 12

#### week 11  class 21

- **class 21**  Tue, Nov 17
  - the Milky Way

- **class 22**  Thu, Nov 19
  - external galaxies

#### week 12  class 23

- **class 23**  Tue, Nov 24
  - the Hubble law and the expansion of the universe

  - **no class: Thanksgiving**

#### week 13  class 24

- **class 24**  Tue, Dec 1
  - the CMB, the big bang model

- **class 25**  Thu, Dec 3
  - the Friedmann equation

#### week 12.5  class 26

- **class 26**  Tue, Dec 8
  - dark matter and dark energy

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**note: schedule is subject to change**

There will be four or five lab meetings throughout the semester; they will be on Wednesday nights, starting at 8pm and will involve using the telescope to take astronomical data (including an exoplanet transit) and also learning how to reduce and analyze data with the goal of making quantitative measurements (of, for example, the size of a particular exoplanet). We will also use some of the Wednesday night lab time to learn and discuss material relevant to observational astronomy.