Astronomy 110, Section 5 (Get a PDF of this syllabus here)
Fall 2005, T Th 9:00-10:15AM, 112 Watanabe

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Final Exam: Dec 13, 2005; 9:45-11:45AM

Text: *The Essential Cosmic Perspective* (3rd edition, Media Update), Bennett, Donahue, Schneider, & Voit,

1. Overview – Chapter 1, App A, C  
   Lecture 1  
   [08/23]
   a) Why Astronomy?
      i) Our Story
      ii) How We Know What We Know?
   b) How Big? How Far? When?

2. The Night Sky I: The Celestial Sphere - Chapter 2  
   Lecture 2,  
   [08/25]
   a) Constellations
   b) The Ecliptic
   c) Latitude, Longitude and Time

3. The Night Sky II. Seasons - Chapter 2  
   Lecture 3,  
   [08/30]

4. The Night Sky III. Eclipses and Phases - Chapter 2  
   Lecture 4,  
   [09/01]

5. The Night Sky IV - Chapters 2, 3  
   Lectures5 + 6,  
   [09/06]
   a) The Wanderers
   b) The Quest for Calendars

6. Astronomy: The Science - Chapter 3  
   Lectures5 + 6,  
   [09/08]
   a) Astronomy in the Ancient World
   b) Early Observations
   c) Early Theories

7. Early Thinking About the Universe.  
   Lecture 7  
   [09/13]
   a) The Geocentric Universe
   b) Islam and Astronomy.

8. The Heliocentric Universe - Chapter 3, 4,  
   Lecture 8  
   [09/15]
   a) Copernicus
b) Tycho and Kepler
   c) Kepler’s Laws
9. The Birth of Science - Ch 4, App B Lecture 9,10 [09/20]
   a) Galileo and The Nature of Motion
   b) Newton - The Laws of Motion
10. Gravity - Chr 4, App B Lecture 9,10 [09/22]
11. Conservation of Energy - Chr 4, App B Lecture 9,10 [09/27]
12. Test I: Chapters 1-4 [09/29]
   a) Atoms, isotopes and ions
   b) Atomic Energy levels
   c) Atoms and photons
   d) Energy of a photon
14. The Nature of light, Chapter 5 Lecture 11, 12 [10/06]
   a) Waves, wavelength, frequency, velocity
   b) The electromagnetic spectrum
   c) Interaction of light with matter
   d) reflection and refraction
      i) transmission, absorption, color
      ii) Atomic Spectra
      iii) Emission and absorption spectra
      iv) Spectral identification
15. Learning From Light, Chapter 5 Lecture 13, 14 [10/11]
   a) Composition – Spectra
   b) Temperature – Black Body Radiation
      i) Nature of Black Body radiation
      ii) The Black Body Spectrum
      iii) Spectra of real objects
   c) Speed: The Doppler Effect
      i) How we measure speed
      ii) The radial component of velocity
      iii) Redshift, blueshift
16. Telescopes, Chapter 5 Lecture 13, 14 [10/13]
   a) Why telescopes?
      i) Sensitivity – collecting area
      ii) Angular Resolution - diameter
      iii) Invisible radiation – infrared, UV, x-ray etc.
   b) Types of telescopes:
      i) Reflecting and refracting
      ii) Radio telescopes
      iii) X-ray telescopes
   c) Why telescopes in space?
      i) Atmospheric absorption.
      ii) Turbulence
   d) Adaptive optics
17. The Solar System – Chapter 6, App E, Lecture 15 [10/18]
**a) Observed properties.**

i) Terrestrial and Jovian planets  
ii) Planet orbital and spin parameters  
iii) Asteroid and Kuiper belts  
iv) Comets

**b) Formation of the Solar System**

<table>
<thead>
<tr>
<th>18.</th>
<th>The Terrestrial Planets - Chapter 7, <strong>Lecture 16</strong></th>
<th>[10/20]</th>
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<tbody>
<tr>
<td>19.</td>
<td>The Gas Giants - Chapter 8 <strong>Lecture 17</strong></td>
<td>[10/25]</td>
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<td>20.</td>
<td>Hydrostatic Equilibrium – Chapter 10, P259 + <strong>Notes</strong></td>
<td>[10/27]</td>
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<td>21.</td>
<td>The Solar Family - Chapter 9 <strong>Lecture 17</strong></td>
<td>[11/01]</td>
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<td>22.</td>
<td>The Sun, Chapter - 10</td>
<td>[11/03]</td>
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<tr>
<td></td>
<td>a) Hydrostatic Equilibrium</td>
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<td>c) Sunspots</td>
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| 24.                      | **Test II: Chapter 5-9**                             | [11/10] |
| 29.                      | Galaxies II: Other Galaxies - Chapter 15, App G      | [12/01] |
| 30.                      | Galaxies III: Active Galaxies, Quasars – Chapter 15  | [12/06] |
| 31.                      | Cosmology I: The Big Bang - Chapter 17               | [12/08] |

**Final Exam**                                                                             [12/13]