Course Organization and Goals

Instructors:

Roger K. Ulrich, 825-4270, Office: 3-431 PAB, Professor

Teaching Assistant, TBD

- The course grade will be based on eight quizzes from Cosmic Perspectives having a total weight equal to half a midterm, in-class clicker questions from each lecture with the total from all lectures having a weight equal to half a midterm, two midterms and a final with the final having equal weight as the two midterms. One midterm may be skipped with prior permission from the instructor or for medical reasons with subsequent medical documentation.

- The midterms and final will be in a multiple choice format.

- The course will be based on the textbook:

  Cosmic Perspective: Stars, Galaxies & Cosmology, Fourth Edition by Bennett et al.,

  Lecture Notes by R.K. Ulrich, Distributed through the class web site.

- Course hours:

  Lectures TR 11:00am to 12:15pm in the Physics and Astronomy Building (PAB) 1-434a.

  Discussions – Th 1 PM Boelter 5422 and Th 2 PM Math-Sciences 5127

  Office Hours, R.K. Ulrich – Tues, 1 PM, 3-431 PAB or by appointment.

  Final Exam, Wednesday, Jun. 13, 11:30 am to 2:30 pm in the regular lecture room.

- This course will provide a generally non-mathematical but physical introduction to stars and their last stages of life with an emphasis on the violent endings which occur.

- The concepts of general relativity leading to the formation of Black Holes will be developed qualitatively and the properties of space-time near Black Holes will be described.
Web Sites Information: www.physics.ucla.edu and www.masteringastronomy.com

The class notes can be found at:
http://www.physics.ucla.edu/class/07S/4_ULRICH/notes/index.html

Feel free to print these notes for your own use but please do not copy or repost them. A good plan is to print them single sided and use the backs for additional notes you take during the lectures. I post these notes as a supplement to the lectures, not a replacement. In the event that class attendance drops, I will discontinue the posting of the notes.

A quiz tool is provided by the textbook publisher (www.masteringastronomy.com). You need to use the access number provided in the text. If you purchased a used text, please purchase access to the web site since the course quizzes, midterms and final exam all draw from the quiz banks available on this web site. If you do not take the masteringastronomy quizzes, you will be at a substantial disadvantage for the regular exams and probably receive a poor grade in the class. Although the quiz site allows you to enroll in this class and provides a grading system, I will not be using grades from this site. Instead, questions from the publisher web site are collected and modified to create the class quizzes which are due Tuesdays until after the second midterm and then due Thursdays.

The quizzes can be taken only once and must be started before the due time. If your quiz taking session is ended due to a computer problem or other human error, you will not be able to complete the quiz. Please let me know what happened in such cases and I may conclude that you should be excused from the quiz. After the due time for the quizzes, I will post the answer key so it is not possible to make up missing quizzes.
Course Schedule — Part 1

Reading: Bennett et al. Preface and Chapters 1, 2, 3.3, S1, 4 to 6; Ulrich, Note Sets 1 to 7

Class Meeting Number. Date — Lecture Subject

1. Apr. 3 — General introduction, Orientation to our place in the universe.

2. Apr. 5 — Geometry of the sky and solar system, distances to stars.

3. Apr. 10 — Measurement of time. What is the nature of time? Quiz 1 due 11 PM, Covers Chapters 1 and 2.

4. Apr. 12 — Energy and atoms. What are the natures of temperature, density and pressure?

5. Apr. 17 — Kepler’s laws of planetary motion and their relationship to the law of gravitation. Quiz 2 due 11 PM. Covers Chapters 3.3, S1 and 4

6. Apr. 19 — The nature of light and energy in the universe.

7. Apr. 24 — Telescopes and the measurement of the universe. Quiz 3 due 11 PM, Covers Chapters 5 and 6.

Apr. 26 — Midterm 1 covering up to lecture 7, Chapters 1, 2, 3.3, S1, 4, 5 and 6; 50 multiple choice questions.
## Course Schedule — Part 2

**Reading:** Bennett *et al.* Chapters S2, S3, S4, 14, 15, 16.1 and 17; Ulrich, Note Sets 8 to 15

<table>
<thead>
<tr>
<th>Class Meeting Number</th>
<th>Date</th>
<th>Lecture Subject</th>
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<tbody>
<tr>
<td>8</td>
<td>May 1</td>
<td>Space and time.</td>
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<tr>
<td>9</td>
<td>May 3</td>
<td>Spacetime and Gravity.</td>
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<tr>
<td>10</td>
<td>May 8</td>
<td>Building Blocks of the Universe. Quiz 4 due 11 PM, Covers Chapters S2 and S3.</td>
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<tr>
<td>11</td>
<td>May 10</td>
<td>Our friendly? neighborhood star the Sun.</td>
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<tr>
<td>12</td>
<td>May 15</td>
<td>What are stars. Quiz 5 due 11 PM, Covers Chapters S4 and 14.</td>
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<tr>
<td>13</td>
<td>May 17</td>
<td>Measuring stars – surface temperature, radius and luminosity.</td>
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<tr>
<td>14</td>
<td>May 22</td>
<td>The ending points of star lives, supernovae, neutron stars, black holes.</td>
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<tr>
<td>15</td>
<td>May 24</td>
<td>Black Holes, Neutron Stars and Space-time, gamma-ray bursts, Black hole mergers and gravity waves. Quiz 6 due 11 PM. Covers Chapters 15, 16.1, 17 and 18</td>
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**May 29** — **Midterm 2 covering lectures 8 to 15, Chapters S2, S3, S4, 14, 15, 16.1 and 17; 50 multiple choice questions.**
Course Schedule — Part 3

Reading: Bennett *et al.* Chapts. 19 to 23; Ulrich, Note Sets 16 to 18

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<thead>
<tr>
<th>Class Meeting Number</th>
<th>Date</th>
<th>Lecture Subject</th>
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<tbody>
<tr>
<td>16</td>
<td>May 31</td>
<td>Our galaxy and Galaxy Evolution, Missing matter throughout the universe. Quiz 7</td>
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<td>due 11 PM, Covers Chapters 19 and 20</td>
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<tr>
<td>17</td>
<td>Jun. 5</td>
<td>Standard Candles and their use in measuring distance and the expansion of the universe.</td>
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<td>18</td>
<td>Jun. 7</td>
<td>Dark Matter and the evolution of the universe, the beginning of time. Quiz 8 due 11 PM, Covers Chapters 21 to 23</td>
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Final Exam — Wednesday, Jun. 13, 11:30 am to 2:30 pm, 1-434A Physics and Astronomy Building

- The final exam will have 100 questions.
- The first 35 questions are a midterm on the final three lectures.
- The remaining 65 questions are a review of the whole course including the last three lectures.