Astronomy 122 – Course Information
(http://www.uoregon.edu/~haydock/Astr122Info.html)

Birth and Death of Stars  CRN 15464  September 27, 2004

This second introductory astronomy course focuses on the Sun and other stars, their origin, evolution, and destruction. This course requires minimal mathematics - some arithmetic and a little algebra.

Classes:  Mondays, Wednesdays and Fridays 09:00 to 09:50 in Room 180 PLC.
Instructor: Roger Haydock (haydock@darkwing), 172 Willamette Hall, 346-5221. Office hours – Tuesdays and Thursdays 08:00 to 09:00 or by appointment.
Assistants: Eric Hoffman (ehoffma1@darkwing), office hours - Tuesdays and Thursdays 10:00 to 11:00, Room 220, Willamette Hall, 346-4792; and Scott Ernst (sernst@darkwing), office hours - Tuesdays and Thursdays 09:00-10:00, Room 218, Willamette Hall, 346-4760.


Alternative: Instead of buying the text, students may choose to attend all classes and take thorough notes. Review and Discussion questions and Problems will be posted at the above website. Approval from the instructor is required for this option.

Homework: Prepare for each class by reading the assigned material in the text and answering the appropriate questions from the self-tests. After class reread the material and write out the answers to the questions on that material in Review and Discussion. Try a few of the relevant Problems. Be sure to use complete sentences as well as diagrams and formulas in answering the questions and problems. You should be spending about 6 hours per week, outside of class, studying the text or notes, answering questions, and solving problems.

Midterms: Friday, October 15, and Friday, November 5, there will be midterms in class. Each midterm will consist of ten questions similar to Review and Discussion questions or the simpler Problems. The purpose of the midterms is to tell you how you are progressing with the course. Only your midterms which are better than your final examination will be averaged into your final grade.

Final Exam: Friday, December 10, THE LAST DAY OF EXAM WEEK, at 10:15 in Room 180 PLC is Required. Do not plan to leave town before this! This exam will consist of twenty questions similar to Review and Discussion questions or the simpler Problems.

Project: Because this is a four credit course meeting three hours per week, each student is required to plan, conduct and report on a quantitative test of an astronomical principle covered by the course. Examples of the kind of observations appropriate for this project are measurements of the rotational period of the Sun by observing sunspots, measurement of the power produced by the Sun, or measurement of the Solar spectrum. Other kinds of observations are possible, but should be discussed in advance with the Instructor; originality is encouraged. Examples of principles appropriate for testing in these projects are the rotational properties of the Sun, its power output, its composition, and so forth.

The grade for each project will be based on a written report, due at the final exam, of not more than 1,000 words, but which may contain sketches, graphs, photographs, equations, and so forth. Reports should be written so as to be understandable to other members of the class and should include an introduction to the principle being tested, a description of how the observations were made, the data obtained, and a discussion of whether or not the results support the principle under investigation.

The total effort on the project should be about 3 hours per week, or a total of 30 hours for the course.

Continued on the back of this page
Grading: The Final grade is 75% Exams + 25% Project. The exam grade is the average (weighting individual questions equally) of the Final Exam and any Midterms which were better than the Final. The principle for grading exams is that demonstration of understanding of 2/3 or more of the material is at least an A-, ½ or more at least a B-, and 1/3 or more at least a C-. The project is graded on the principle that a coherent report reflecting 30 hours of effort earns a B (A if the project is outstanding in some respect).


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Birth and Death of Stars – ASTR 122
First Midterm – October 15, 2004, 09:00-09:50

Instructions: Print your name and student identification number at the top of this page. Answer each of the ten parts of questions A through G in the numbered spaces with at most a sentence or two, a formula, and a sketch. Note that the questions continue on the back of this page. Each answer is worth 2 points.

A. State Stefan's law and explain how it is applied in astronomy.
   1.
   2.

B. Define interferometry and explain how it is used in radio telescopes.
   3.
   4.

C. Why do infrared telescopes have to be cooled?
   5.

Continued on Back
D. What is diffraction of waves?

E. State Kirchoff's laws of spectroscopy.

F. What is a photon?

G. The frequency of KLCC is about 100 M Hz (100,000,000 Hz) and the speed of light is about 300,000 km/s (300,000,000 m/s). What is the wavelength of these radio waves?
Birth and Death of Stars – ASTR 122
Second Midterm – November 5, 2004, 09:00-09:50

Instructions: Print your name and student identification number at the top of this page. Answer each of the ten parts of questions A through G in the numbered spaces with at most a sentence or two, a formula, and a sketch. Note that the questions continue on the back of this page. Each answer is worth 2 points.

A. Sketch and label a diagram of the main regions inside the Sun.
   1.

   2.

B. Sketch the main sequence on the Hertzsprung-Russell diagram being sure to label the axes.
   3.

   4.

C. What is the source of the Sun’s energy?
   5.

Continued on Back
D. Why is the detection of solar neutrinos so important?

E. What in the interstellar medium causes the reddening of stars, and why?

F. Define a parsec.

G. What is the origin of 21 cm radiation?
Birth and Death of Stars – ASTR 122
Final Examination – December 10, 2004, 10:15-12:15

Instructions: Print your name and student identification number at the top of this page. Answer each of the twenty parts of questions A through Q in the numbered spaces with at most a sentence or two, a formula, and a sketch. Note that the questions continue on the back of this page and on both sides of the next page. Each answer is worth 2 points.

A. State Wien’s law.
   1.

B. For what parts of the electromagnetic spectrum is the Earth’s atmosphere transparent enough to allow astronomical observations from the Earth’s surface?
   2.

C. State Kirchoff’s laws of Spectroscopy.
   3.

4.

D. Why are radio telescopes very large?
   5.

Continued on Back
E. How does the Earth's atmosphere limit the useful size of optical telescopes on the Earth's surface?

6.

F. Sketch and label a diagram of the interior of the Sun.

7.

8.

G. Sketch and label the axes and the main sequence on a Hertzsprung-Russell diagram.

9.

10.

Continued on Next Page
H. Why is 21-cm radiation useful in astronomy?
   11.

I. Why do dust clouds make the stars behind them appear redder?
   12.

J. What is the role of rotation in the process of stellar birth?
   13.

K. Stars live much longer than we do, so how do astronomers test the accuracy of theories of star formation?
   14.

L. What makes an ordinary star become a red giant?
   15.

Continued on Back
M. What is hydrostatic equilibrium?
   16.

N. What occurs in a massive star to cause it to explode?
   17.

O. Under what circumstances does a binary star produce a nova?
   18.

P. Why aren't all neutron stars seen as pulsars?
   19.

Q. Why are black holes said to be 'black'?
   20.