ASTR 122: Birth and Death of Stars
Ben Farr
Winter 2023

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Web: canvas.uoregon.edu/courses/211799
Office Hours: see below
Office: Willamette 470
Class Hours: MWF 02:00-02:50 p.m.
Class Room: Willamette 100
Textbook: Astronomy 2e (OpenStax)

Instructor Office Hours

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Office Hours</th>
<th>Location</th>
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<tbody>
<tr>
<td>Farr</td>
<td>W 3:00-4:00PM</td>
<td>WIL 470</td>
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<tr>
<td>Merritt</td>
<td>Th 11:00AM-12:00PM</td>
<td>WIL Atrium</td>
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<tr>
<td>Dillon</td>
<td>W 1:00-2:00PM</td>
<td>WIL Atrium</td>
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<tr>
<td>Juarez-Reyes</td>
<td>Tu 4:00-5:00PM</td>
<td>WIL 220</td>
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You can also make use of the Physics Drop-In Help Center, where you can get help from Physics PhD students (including our class’s TA’s)!

Course Description

The course is an introduction to the science of astronomy for non-science and science majors, with an emphasis on stellar astronomy and the contents of our Galaxy, the Milky Way. Our star, the Sun, is directly or indirectly the source of all the energy necessary to sustain life on our world. This course will study the birth, evolution and death of stars in the Milky Way galaxy, with a particular emphasis on the underlying science behind stellar and galactic evolution, the observational aspect to astronomy and our knowledge of how the Universe operates on the stellar scale.

The goals of this course are 1) an introduction to the basic forces of Nature and structure of matter, 2) to obtain an understanding of the science and techniques that underlie observational astronomy, and 3) develop problem solving skills relating to the mathematics, physics and chemistry of stars. In addition, this course traces the history of our developing knowledge of stars and our galaxy in order to explore how the scientific method works and how civilization has gained from the progress of science and technology. The interplay between technology (telescopes, space observatories) and knowledge gained about the stars is a key theme to the course.

Core Education

Area of inquiry: Science

Learning Outcomes:

- Critical Thinking
- Explanation of issues, assumptions, or hypotheses.
- Facilitate with methods of reasoning appropriate to the discipline (such as inductive, deductive, scientific, or aesthetic reasoning, or statistical inference).
- Using relevant and credible evidence, information, or hypotheses to describe, investigate or analyze a situation, or draw a conclusion.

• Creative Thinking
  - Innovative Thinking: connecting, synthesizing or transforming ideas in discipline-specific ways. Solving Problems.

Course Policies

Communication

I’ll use Canvas as our primary mode of communication. Please make sure that your notifications are setup appropriately so that you see classroom announcements.

Classroom Community Expectations

I want this course to be engaging, with lively discussion. Never hesitate to interrupt with a question or to contribute to a discussion. I am also happy for quiet discussions to happen among you if it’s related to the class content.

Laptops and tablets are encouraged for notetaking, but if you’re going to be doing anything more then please sit in the back to not distract others.

Textbook

We will be using a free, open-source Astronomy textbook from OpenStax.

https://openstax.org/details/books/astronomy-2e

Reading annotations will be a big part of this course, so I encourage you to complete reading assignments on Perusall (linked to from Canvas) so you can annotate as you go.

For convenience I’ve also provided PDF, AZW3, and EPUB versions of the book on Canvas so that you can upload to your favorite e-reader.

Grading

Your grade will be determined by your performance in the class. The way I will assess your performance is through discussions on the reading, activities, homework, exams, and the final project. Here are the components of your final grade

• Reading & Annotation — 20%
• Activities — 20%
• Homework — 20%
• Project — 5%
• Exam #1 — 15%
• Final Exam — 20%

Here are important notes about the grading:
• The exams are:
  - cumulative
  - online
  - open book
  - not timed
• Anything that is said in class, shown on slides, or discussed within reading assignments is testable.
• There may be opportunities for extra credit.
• These conditions are subject to change.

Course Outline
This will change, so stay tuned!

Week 1, January 9:
• Science and the Universe (Chap 1)
• Chap 2: Observing the Sky

Week 2, January 16:
• Orbits and Gravity (Chap 3[.1-.5])
• Radiation and Spectra (Chap 5)

Week 3, January 23:
• Astronomical Instruments (Chap 6)

Week 4, January 30:
• The Sun’s Properties (Chap 15)

Week 5, February 6:
• The Sun’s Nuclear Fusion (Chap 16)
• Exam #1

Week 6, February 13:
• Analyzing Starlight (Chap 17)

Week 7, February 20:
• A Celestial Census (Chap 18)
• Celestial Distances (Chap 19)

Week 8, February 27:
• The Birth of Stars (Chap 21)

Week 9, March 6:
• Stars from Adolescence to Old Age (Chap 22)
• The Death of Stars (Chap 23)
Week 10, March 13:
• Black Holes and Curved Spacetime (Chap 24)
• Final Exam

University Policies

Academic Disruption
In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements and/or access alternative assignments. Students are also expected to continue coursework as outlined in this syllabus or other instructions on Canvas.

Accessibility
The University of Oregon and I are dedicated to fostering inclusive, equitable, and accessible learning environments for all students. The Accessible Education Center (AEC) assists students with disabilities in reducing barriers in the educational experience. You may be eligible for accommodations for a variety of disabilities – apparent disabilities, such as a mobility or physical disability, or non-apparent disabilities, such as chronic illnesses or psychological disabilities. If you have or think you have a disability and experience academic barriers, please contact the Accessible Education Center (Location: 360 Oregon Hall; 541-346-1155; uoaec@uoregon.edu) to discuss appropriate accommodations or support. The details of your disability will be kept confidential with the AEC and you are not expected to share this information with others. However, I invite you to discuss any approved accommodations or access needs at any time with me.

Your Well-Being
Life at college can be very complicated. Students often feel overwhelmed or stressed, experience anxiety or depression, struggle with relationships, or just need help navigating challenges in their life. If you’re facing such challenges, you don’t need to handle them on your own—there’s help and support on campus.

As your instructor if I believe you may need additional support, I will express my concerns, the reasons for them, and refer you to resources that might be helpful. It is not my intention to know the details of what might be bothering you, but simply to let you know I care and that help is available. Getting help is a courageous thing to do—for yourself and those you care about.

University Health Services help students cope with difficult emotions and life stressors. If you need general resources on coping with stress or want to talk with another student who has been in the same place as you, visit the Duck Nest (located in the EMU on the ground floor) and get help from one of the specially trained Peer Wellness Advocates. Find out more at health.uoregon.edu/ducknest.

University Counseling Services (UCS) has a team of dedicated staff members to support you with your concerns, many of whom can provide identity-based support. All
clinical services are free and confidential. Find out more at counseling.uoregon.edu or by calling 541-346-3227 (anytime UCS is closed, the After-Hours Support and Crisis Line is available by calling this same number).

**Basic Needs**

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course is urged to contact the Dean of Students Office (346-3216, 164 Oregon Hall) for support.

This UO webpage includes resources for food, housing, healthcare, childcare, transportation, technology, finances, and legal support:

https://blogs.uoregon.edu/basicneeds/food/.

**Academic Integrity**

The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students’ obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at https://researchguides.uoregon.edu/citing-plagiarism.

**Student Experience Surveys**

Please, please, please fill these out! I read through all of your feedback to improve the course!

**Mandatory Reporter Status**

I am an assisting employee. For information about my reporting obligations as an employee, please see Employee Reporting Obligations on the Office of Investigations and Civil Rights Compliance (OICRC) website. Students experiencing sex or gender-based discrimination, harassment or violence should call the 24-7 hotline 541-346-SAFE [7244] or visit safe.uoregon.edu for help. Students experiencing all forms of prohibited discrimination or harassment may contact the Dean of Students Office at 5411-346-3216 or the non-confidential Title IX Coordinator/OICRC at 541-346-3123. Additional resources are available at investigations.uoregon.edu/how-get-support. I am also a mandatory reporter of child abuse. Please find more information at Mandatory Reporting of Child Abuse and Neglect.