Hello and Welcome!
Hello and welcome to ASTR 123! I’m excited for you to join me this term. I grew up in Colorado and studied Engineering Physics at the Colorado School of Mines, where I began my teaching journey as an undergraduate teaching assistant. I came to the UO to pursue a PhD in physics, studying optical materials for solar applications. Along my journey, I found that teaching captured my curiosity more than my projects in the lab. I’m so grateful to teach you one of my favorite topics: astronomy!

Course Description
ASTR 123 focuses on the contents, formation, and evolution of the Universe. We will study our home galaxy, the Milky Way, and compare it to other types of galaxies. You will see how astronomers look back in time (literally) to examine ancient galaxies, and peer at the Universe’s oldest light to decode the fingerprints of the Big Bang. We’ll explore cosmology, a field at the intersection of observational astronomy, theoretical physics, and philosophy, to ask deep questions about humankind’s existence: where do we come from, and what is our fate?

I do not assume vast prior knowledge of science or math. We’ll teach you to apply the quantitative reasoning you’ll need. Your chances of success in this course are high if you ask a lot of questions starting with "why," "how" and "what if" - because curiosity fuels science.

This course is designated as a Natural Science Core Education course. At UO, Core Education is designed to provide a broad, interdisciplinary education that helps students think critically and creatively, communicate clearly, and reflect ethically. Specifically, in this class, you will learn and practice Critical Thinking through In-Class Activities, Homework, and Think & Explain Questions. You will practice Written Communication through our two course Projects.
Course Objectives

By the end of the course, you will be able to…

● **Experience science as a process and a skill:**
  ○ Formulate questions based on your curiosity, then build and refine your mental models (hypotheses) in an iterative process that mirrors the practice of astronomy.
  ○ Support arguments and draw conclusions by interpreting data, figures, graphs, and images, and applying physical principles, quantitative reasoning, and logical thinking.
  ○ Express and reflect upon your mental models during class using various representations (words, images, diagrams, and even gestures) in order to collaborate in knowledge-building with your peers (mirroring how scientists learn as a community).

● **Build an awareness of astronomy as an evolving discipline**
  ○ Communicate about astronomy topics in writing or multimedia formats to an audience of your peers, with care taken to center quality sources of evidence and to craft your message according to the context, audience, and purpose of your projects.
  ○ Hone an awareness of open questions in astronomy, which will help you to better appreciate, analyze, and critique the astronomy you encounter in news media, social media, and popular culture.

● **Build an understanding of galaxies:**
  ○ Explain what types of observations allowed us to map the Milky Way.
  ○ Describe the structure of different types of galaxies, including the locations and motions of old stars, young stars, gas, dust, and dark matter.
  ○ Discuss the characteristic features of galaxies and what wavelengths of light are used to observe each type of feature.
  ○ Compare and contrast active galactic nuclei to quiescent ones, and discuss some reasons why the energetic output of galactic centers can change over time.

● **Trace the evolution of the Universe:**
  ○ Explain the connection between a galaxy’s distance and velocity (Hubble’s Law) and how we interpret the meaning of Hubble’s Law.
  ○ Discuss how we infer the age of the Universe based on its expansion rate.
  ○ Describe how galaxies are distributed in space and the connection of that distribution to the evolution of matter and energy in the early Universe.
  ○ Name the epochs of the early Universe and what key events occurred in each.
  ○ Describe the potential endings for the Universe, connect them to the shape of space-time and the current density of energy and matter, and explain which trajectory our Universe appears to be on based on our current understanding.

I’m not a science major. Why should I take an astronomy course?

● Astronomy builds skills employers want, including scientific and quantitative reasoning.
● You will learn strategies for independent learning and study that will serve you well in other classes, and in your journey of lifelong learning.
● Astronomy is part of our history and life. Learning astronomy is inspiring and contributes to a sense of purpose and belonging in our world - a sense of being an “Earthling.”

Where can I find detailed learning goals that I can use to study?

● In our study guide, lecture slides, and Canvas assignment descriptions.
Andrea’s Teaching Philosophy

Research shows that people learn best through active learning, in which learners are active participants rather than passive observers. Our course design provides structured learning opportunities before, during, and after class to help you engage your brain and monitor your own understanding as you build your knowledge about astronomy.

Each learning opportunity plays a different role, thus they all contribute to your grade, with flexibility built-in and tailored to each mode. If you find that any element of this course design presents a barrier to you or that you would benefit from different types of learning opportunities, please let me know.

Learning Opportunities and Assessments

Class Preparation: You are expected to read the daily textbook sections and watch the recommended videos. While prep is ungraded, class will be most effective for everyone if you are familiar with key terms before class. A “shallow” read before class and “deep” read after class can be highly productive.

In-Class Activities: We will work together on interactive activities on Canvas during class to guide you through new ideas, so please bring a device. You have unlimited attempts so that you can learn from your mistakes. Due after class, but activities never close, so you can practice with them repeatedly. Focus on understanding and ask lots of questions during class!

Homework: Homework will flex your critical thinking skills and guide you to apply new ideas. Homework will be challenging. You will have two attempts and should strive to build understanding as you make mistakes and try again. Please, work together! However, don’t just swap answers: you’ll learn more if you ask for explanations and explain what you understand to others. I invite you to office hours to find study partners, ask questions, and get some coaching.

Due Mondays at midnight, grace period through Tuesday at noon; deadline is firm because feedback (correct answers and occasional video explainers) will be delivered just after the grace period. I will offer makeup homeworks approximately every two weeks, and your lowest score will be dropped.

Collaborative Quizzes: Short quizzes will help you calibrate your understanding. You will have two attempts; only the highest score will count toward your grade. Attempt one is to be done before class, on your own. You will be able to see your score, but not which questions you got right or wrong. For attempt two, you will have the chance to discuss your thinking with others in class (this process mirrors the practice of science). We will review quizzes in class immediately after they are due.

Quizzes are open-book and open-note, but you should strive to attempt quizzes without these aids to maximize your learning. You have an opportunity to retake quizzes within one week. Retakes will be modified slightly, and you will have only one attempt.

Think & Explain Questions: We will ask you to explain your reasoning on selected topics via a written or video explanation. You may work together to craft your explanations, but the work you submit should be your own (and you should cite any sources you use). About 3 of these will be dropped, out of 8 or 9 total offerings.
Weekly Reflections: You’ll reflect on your learning, how you’re doing overall, and how we conduct the course. This is your chance to give me feedback - use it! Due Mondays at midnight.

Project: You will create two short projects to explore your curiosity and demonstrate your learning expressively. You can work solo, or in groups of 2-4, and will have an opportunity for peer review before grading occurs. Due during weeks 5 and 10. Topics include:

- **Scientist Spotlight**: Learn more about astronomers past and present.
- **AstroBites**: Summarize new research results in astronomy. I will keep a forum open where I will share relevant recent astronomy discoveries relevant to our weekly topics. You’re also invited to also post astronomy you find in the news each week! If you’re interested in a project analyzing real-life data as an alternative to the AstroBites assignment, let me know by the end of week 5.

Final Exam: The final exam will cover everything in the course. You will complete the final individually, and we will proctor it in class during our university-scheduled final exam time (Monday, December 4, 10:15 am - 12:15 pm). If you miss the final due to an emergency or illness, you must request an incomplete grade and I will schedule a makeup exam for you next term. Absolutely no early exams will be permitted for any reason. Making travel plans without consulting the final exam schedule does not constitute an emergency, so please put the final on your calendar now!

The final exam questions will be in a format similar to homework and quiz questions. You will be expected to apply ideas in some novel (and fun) ways, but mostly the final will test your understanding of core concepts. In the past my final exams have been quite challenging; however, I’m trying to soften it up this term (without lowering my high expectations).

You’re allowed an 8.5 x 11 inch reference sheet with information on both front and back sides for the final exam. Leading up to each quiz, I will invite you to share a draft of your reference sheet for that quiz unit. Each of these will be worth 0.25% extra credit (for a total of 1%).

The final exam weighting has been carefully considered to maximize the opportunity for you to improve your final grade, while avoiding the unnecessary stress of a highly-weighted final. You’re unlikely to “save your grade” in an epic way by acing the final after a lackluster term. Plus, you’re more likely to do well on the final if you fully understand the course material. So, the best way to earn a good grade in the class is to engage completely in all learning opportunities, and ask lots of questions.

Study Guide: Our study guide (on Canvas) will include effective study practices, learning goals, and links to weekly study guides, which you can use to guide your reading or to study throughout the term.
## Time Estimates and Grade Weighting

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Frequency &amp; Grading Policy</th>
<th>Due Date</th>
<th>Percent of Grade</th>
<th>Out-of-class time per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Class Preparation</td>
<td>Daily, ungraded</td>
<td>N/A</td>
<td>0%</td>
<td>2 - 3 hours</td>
</tr>
<tr>
<td>In-Class Activities</td>
<td>~ Daily 20% dropped</td>
<td>Due after class, but no cutoff date.</td>
<td>10%</td>
<td>~ 30 minutes (to review)</td>
</tr>
<tr>
<td>Homework</td>
<td>~ Weekly 2 attempts, plus makeup 1 dropped</td>
<td>Due Mondays at midnight. Grace period through Tuesday at noon.</td>
<td>30%</td>
<td>2 - 3 hours (including office hours)</td>
</tr>
<tr>
<td>Think &amp; Explain Questions</td>
<td>5 graded out of 8 or 9 offered</td>
<td>Due Mondays at midnight. Grace period through Tuesday at noon.</td>
<td>10%</td>
<td>~ 20 minutes</td>
</tr>
<tr>
<td>Weekly Reflections</td>
<td>Weekly, ungraded</td>
<td>Due Mondays midnight.</td>
<td>0%</td>
<td>~ 15 minutes</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Weeks 3, 6, 8, 10</td>
<td>Due on quiz days at 12:15pm (1st attempt to be done before class). Open one class day before due.</td>
<td>20%</td>
<td>~ 30 minutes</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Finals Week</td>
<td>In person during final exam time.</td>
<td>20%</td>
<td>-</td>
</tr>
<tr>
<td>Projects</td>
<td>Weeks 5 and 10</td>
<td>Due Mondays at midnight.</td>
<td>10%</td>
<td>&lt; 30 minutes</td>
</tr>
</tbody>
</table>

**Time estimate:** The total out-of-class time is about 8-12 hours per week (the time above, plus about 2-4 hours per week of individual or group study, possibly in the Drop-In Help Center, in Price Science Commons B010). You should spread your study time out to get the most out of your effort.

**Grade scale:** A: 90%, B: 80%, C: 70%, D: 60%. I use plus/minus: plus for grades ending in 7, 8, or 9 and minus for grades ending in 0, 1, and 2. Since zero grades are mathematically unfair, I give a grade of 50% for any missing work. This policy does not apply to the projects or final exam.

**Curving:** I do not curve course grades, because curving can drive an unhealthy competitive culture, while in our classroom, we value collaboration and growth. It is also unnecessary, because I believe each of you is capable of succeeding within this course structure. Sometimes I will curve final grades by a small amount if the final exam questions contain errors or otherwise do not probe your understanding in the way I intended. Historically, this has resulted in about a 1-2% increase on the final grade, but this is not guaranteed. You should strive to be as prepared as possible for a final exam that asks you to think critically, analyze evidence, and apply your conceptual understanding.
Course Policies and Classroom Expectations

Classroom Expectations for Participation
This class involves a high level of interaction during class to harness the power of learning together. All students are expected to participate by sharing ideas (even when they might be wrong!) and listening as others share theirs. I understand that our class can spark exciting conversations; however, for the sake of maintaining a quality learning environment for others, please stop your conversations at my signal. I recognize that some students may not be comfortable with interactivity (for instance, neurodivergent students or students who are learning English). I encourage you to find ways to participate in class that are comfortable for you, but also to take risks and expand your comfort zone!

Respect for Diversity
You should expect to be welcomed, included, treated with respect, and supported by me and your peers. Students of all racial identities, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, citizenship statuses, ability and other visible and non-visible differences belong in and contribute to this class and this discipline. Please let me know if aspects of the instruction, course design, or class activities and content undermine these principles in any way. To learn about cultivating inclusive experiences, or to voice a concern, check out the Division of Equity and Inclusion and the Center for Multicultural Academic Excellence.

Communication
I will communicate with the class through Canvas announcements, Canvas messages, and email. Please make sure to check your Canvas messages and email regularly. I check my own messages about twice daily; you can expect a response within one business day. I will send at least one announcement each week to remind you of the week’s due dates.

To ask questions about…
- **Course content**: come to office hours! Office hours are free help sessions - come ask questions and work together! You can also ask (and answer!) questions on our Course Content Forum. I cannot efficiently answer content questions by email, but can address common themes as they emerge on the forum.
- **Personal concerns**: email me, or set up a time to chat privately.
- **Procedural questions about assignments (such as due dates) or course policy**: Please post your question on the FAQ Forum. Someone may have already asked (and answered) it! The goal is to save us all time wasted in email back-and-forth. For instance, if I make a mistake, sometimes I receive (and then must respond to) a flurry of emails; I would much prefer one FAQ Forum post which I can address and follow up with an announcement. Thank you in advance!
- **Technical challenges with Canvas**: contact the UO Service Portal.

I will use Canvas announcements to communicate any course changes made in the event of a campus emergency, inclement weather, or illness/emergencies of my own. Usually, students will be expected to continue coursework as outlined on Canvas. Subscribe to UO Alerts for announcements on campus-wide emergencies or closures.
Attendance and Absences
This is an in-person course; a Zoom option will not be offered. There is no grade penalty for absences; however, attendance is important because we will develop our knowledge through in-class activities and peer interactions during class. If you do miss class, you are responsible for completing in-class activities, and are encouraged to attend office hours to discuss key ideas and ask questions.

I will ask you to complete daily attendance logs to record whether you were in class or not and to reflect on what you’ve learned; these will close at the same time as weekly homeworks. You won’t be penalized for not attending, but the logs will provide us both with information on your attendance patterns. You can earn up to 1% extra credit by reflecting on these twice throughout the term, but this opportunity is only available if you’ve completed more than 80% of the attendance logs for that period.

Late Work
Weekly work in this course is due Mondays at midnight (with the exception of Quizzes, which are due during class time). Activities never close (unless they are hand-graded), but the homework grace period ends Tuesday at noon. Grace periods are firm end points, to allow for timely grading and feedback. I have built flexibility into the course through drops, makeups, and retakes tailored to each learning opportunity. I hope that this combination of structure and flexibility supports your learning.

Our late work policy is reason-neutral (doesn’t apply differently based on the reason for work being late) and automatic (grace periods are automatically applied, and I will drop the lowest activities and homeworks during week 7 to assist with decisions about withdrawing). There are exceptions for AEC accommodations and religious observances. If you will miss an assignment or assessment due to a religious obligation or observance, please send me the observance form by the end of week 2.

Asking for Help
You are always welcome to speak with me about challenges you are experiencing inside or outside of the class. If you experience problems causing chronic absences or late work, please let me know so that I can help connect you with resources.

Academic Integrity
The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct, which includes unauthorized help on assignments and examinations, the use of sources without acknowledgment, and publishing class materials without the permission of the instructor (including on sites such as Chegg). I will report suspected misconduct to the Office of Student Conduct and Community Standards. If the Office finds a student has committed misconduct, consequences can include failure of the relevant assignment, or of the course.

However, I do want you to learn together, and find and cite sources properly! Each assignment and assessment will outline whether and how and whether you might work with others so you can clearly act with academic integrity. Info about plagiarism: https://researchguides.uoregon.edu/citing-plagiarism

The use of generative artificial intelligence engines (ChatGPT, Bing AI, etc) is a hot topic in universities everywhere. Note that these tools are not valid sources of information (neither is Wikipedia); you should strive to find sources that have been properly vetted (in our case, by the scientific community). ChatGPT can be a useful tool, but you shouldn’t let it do your thinking (or writing) for you. Finally, note that ChatGPT often generates embarrassingly wrong answers to astro questions!
University Resources

One Stop Resources
A guide to university resources can be found at https://onestop.uoregon.edu/

Basic Needs
Being able to meet your basic needs is foundational to your success as a student at the University of Oregon. If you are having difficulty affording food, don't have a stable, safe place to live, or are struggling to meet another need, visit the UO Basic Needs Resource page (https://blogs.uoregon.edu/basicneeds) for information on support for food, housing, healthcare, childcare, transportation, technology, finances (including emergency funds), and legal support.

Physical Health and Mental Health Resources
Physical and mental health resources are available through the University Health Center. Students with COVID symptoms should consult UO's COVID-19 Safety Resources, and isolate and rest. I appreciate when students wear a mask when they have a cold, and will do so myself.

Mental health is a critical factor in your overall well being. Students often feel overwhelmed or stressed, experience anxiety or depression, or just need help navigating challenges in their life. It’s healthy to seek support. Resources include University Counseling Services and the EMU Duck Nest.

Accessible Education
I want to enable accessible learning for every student by using Universal Design practices, including:

- **Captioning:**
  - I will use presentation software for auto-captioning. The transcript is not always perfect, but students report that this is helpful.
  - All video content shown during class will be either captioned, or narrated by me.

- **Recording:** Anyone is welcome to record class. Please ask peers before recording them.

- **Lengthy Reading:** I will provide the page lengths of reading assignments on Canvas.

- **Slides Prior to Class:** Slides will be provided on Canvas, typically at least 1 day prior to class.

- **Cold Calling:** I will not cold-call students, but I will often invite volunteers to share their thinking.

- **Spelling and Grammar:** There will never be a grade penalty for spelling or grammar errors.

- **Note sheet for exams:** These may be typed or handwritten, for all students.

- **Extended time:**
  - In-class writing will never have a time limit, as in-class activities never close.
  - Extended time does not apply to quizzes, since the attempts are untimed.
  - For the final exam, extended time and reduced distraction environments are offered through the AEC. Schedule your exam with the AEC by the Friday of week 8.

Please notify me if there are aspects of the instruction or design of this course (curricular, physical, or digital) that result in disability-related barriers to your participation (this includes access to lectures, activities, homework or quizzes, and exams). The more I learn about access, the better for every student. If you think you might benefit from accommodations for a disability or learning difference, please contact the Accessible Education Center (http://aec.uoregon.edu/).

Tutoring and Academic Engagement
Learning how to learn is a key theme in our course. The Tutoring and Academic Engagement center offers free tutoring services and resources on healthy learning routines.
Reporting Discrimination, Violence, and Sexual Violence
I am a mandatory reporter of child abuse and an assisting employee for discrimination or violence reporting. As an Assisting Employee, I will direct students who disclose prohibited discrimination and harassment, including sexual harassment or violence, to resources that can help. I will only report information to the university administration if the student requesting assistance asks me to report (unless someone is in imminent risk of serious harm or a minor).

Students who have experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu or call the 24-7 hotline 541-346-SAFE [7244]. Students experiencing all forms of discrimination or harassment may find support through the Title IX office or the Dean of Students: investigations.uoregon.edu/how-get-support

Important Academic Policies and Dates

Incomplete Grades
Incomplete grade requests can be made if an unexpected situation happens near the end of the term which prevents you from completing a minor but essential course requirement. Requests for an incomplete grade must be initiated by the student, and will only be considered for extenuating circumstances after the last day to drop (the end of week 7). Emergencies or illness preventing you from taking the final are the most likely reasons for an incomplete; however, if there is another reason you think qualifies, please email me and we’ll figure it out together.

For the purposes of interpreting UO’s incomplete policy, satisfactory progress is defined as an overall grade (not including the final exam) above 60%. If that threshold is not met, you should proactively communicate with me to seek help. I will also reach out directly if I have concerns about your engagement or progress.

Petitions and Emergency Academic Notification
While students do have petition options after the term if they were unable to make changes during the term, you should make an effort to address your situation during the term if possible.

If you experience extraordinary circumstances causing extensive lack of engagement, it may be appropriate to engage in the Dean of Students’ Emergency Academic Notification process.

Course Experience Surveys
The UO midway and end-of-term Student Experience Surveys will be conducted during weeks 4, 9, and 10. The key parts of the survey are the open-ended questions where you share concrete, actionable feedback and about the teaching practices that stand out to you. My courses continually evolve in response to student feedback, so thank you for your thoughtful reflections!

Fall 2023 Dates & Deadlines

- **Week 1 Saturday:** September 30 is the last day to adjust registration without a ‘W’
- **Week 2 Monday:** October 2 is the last day to add a class via DuckWeb.
- **Week 4:** Midway Student Experience Survey: Open Monday 8:00am-Friday 6:00pm
- **Week 7 Sunday:** November 12 is the last day to withdraw or change grade options.
- **Week 8 Friday:** Schedule final exam with AEC if you have accommodations.
- **Week 10:** The End-of-Term Student Experience survey is available during week 10.
- **Finals week Friday:** December 8, at 5pm, is the last day/time to request an Incomplete.
Office Hour Schedule

Myself and our GTAs hold office hours for this class during the following times. Physics graduate students also staff the free Drop-In Help Center, PSC B010. That schedule will be shared on Canvas.

Abbreviations: **PSC** is the Price Science Commons. **WIL** is Willamette Hall.

Our GTAs are: Marija Glisic, Logan Page, and Juliet Wright.

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<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>9-10</td>
<td></td>
<td></td>
<td></td>
<td>Marija, PSC B010</td>
</tr>
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<td>10-11</td>
<td></td>
<td></td>
<td></td>
<td>Hannah, PSC B010</td>
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<tr>
<td>11-12</td>
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<tr>
<td>12-1</td>
<td><strong>Class</strong></td>
<td><strong>Class</strong></td>
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<td><strong>Class</strong></td>
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<tr>
<td>1-2</td>
<td></td>
<td></td>
<td></td>
<td>Juliet, WIL 220</td>
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<tr>
<td>2-3</td>
<td></td>
<td></td>
<td></td>
<td>Juliet, PSC B010</td>
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<tr>
<td>3-4</td>
<td>Andrea, PSC B040</td>
<td></td>
<td>Logan, PSC B010</td>
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<tr>
<td>4-5</td>
<td>Andrea, PSC B042</td>
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<td></td>
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</tr>
<tr>
<td>5-6</td>
<td>Marija, WIL 449</td>
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</tbody>
</table>

Weekly Routine

The following routine is just a suggestion. Consider sketching out your own class routine in a planner!

<table>
<thead>
<tr>
<th>To Do</th>
<th>Before Monday</th>
<th>Monday</th>
<th>Before Wednesday</th>
<th>Wednesday</th>
<th>Before Friday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To Do</strong></td>
<td>Read for Monday Note Homework Questions</td>
<td><strong>Class &amp; Activity</strong></td>
<td>Read for Wednesday Review &amp; Study</td>
<td><strong>Class &amp; Activity</strong></td>
<td>Read for Friday Attempt Quiz</td>
<td><strong>Class &amp; Activity / Quiz</strong> Continue Homework</td>
</tr>
<tr>
<td><strong>HW Due</strong></td>
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<td></td>
<td></td>
<td></td>
<td><strong>Quiz Due</strong></td>
</tr>
</tbody>
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## Course Schedule

<table>
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<tr>
<th>Wk</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/25 - 9/29</td>
<td><strong>No Class</strong>&lt;br&gt;Classes Begin 9/26</td>
<td><strong>What is Galactic Astronomy?</strong>&lt;br&gt;• Read: Syllabus&lt;br&gt;• Read 1.1 - 1.3&lt;br&gt;• Watch Intro to Astronomy</td>
</tr>
<tr>
<td>2</td>
<td>10/2 - 10/6</td>
<td>Light from the Cosmos&lt;br&gt;• Read 5.1 - 5.3&lt;br&gt;• Watch Introduction to Light</td>
<td>Spectroscopy and Motion&lt;br&gt;• Read 5.4 - 5.6&lt;br&gt;• Watch Redshift</td>
</tr>
<tr>
<td>3</td>
<td>10/9 - 10/13</td>
<td>Galaxy Structure &amp; Colors&lt;br&gt;• Read 25.1&lt;br&gt;• Watch Guide to our Galaxy</td>
<td>Galaxy Structure: Spiral Arms&lt;br&gt;• Read 25.2&lt;br&gt;• Watch The Milky Way</td>
</tr>
<tr>
<td>4</td>
<td>10/16 - 10/20</td>
<td>Gravity and Orbits&lt;br&gt;• Read 3.1 - 3.3&lt;br&gt;• Watch Gravity</td>
<td>Mass of the Galaxy&lt;br&gt;• Read 25.3&lt;br&gt;• Watch Dark Matter</td>
</tr>
<tr>
<td>5</td>
<td>10/23 - 10/27</td>
<td>Center of the Galaxy&lt;br&gt;• Read 24.6-24.7, 25.4</td>
<td>Galaxy Formation&lt;br&gt;• Read 25.5 - 25.6&lt;br&gt;• Watch Why is the Solar System Flat?</td>
</tr>
<tr>
<td>6</td>
<td>10/30 - 11/3</td>
<td>Types of Galaxies&lt;br&gt;• Read 26.1 - 26.2&lt;br&gt;• Watch Galaxies, Part 1</td>
<td>Galaxy Mass and Distance&lt;br&gt;• Read 26.3 - 26.4</td>
</tr>
<tr>
<td>7</td>
<td>11/6 - 11/10</td>
<td>The Discovery of Quasars&lt;br&gt;• Read 27.1</td>
<td>Quasars and AGN&lt;br&gt;• Read 27.2 - 27.3&lt;br&gt;• Watch Galaxies, Pt 2 (1)</td>
</tr>
<tr>
<td>8</td>
<td>11/13 - 11/17</td>
<td>Galaxy Evolution&lt;br&gt;• Read 28.1 - 28.2&lt;br&gt;• Watch Hubble Deep Field</td>
<td>Structure of the Universe&lt;br&gt;• Read 28.3 - 28.5&lt;br&gt;• Watch Galaxies, Pt 2 (2)&lt;br&gt;• Watch Where Do Galaxies Come From?</td>
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<td>9</td>
<td>11/20 - 11/24</td>
<td>Age of the Universe&lt;br&gt;• Read 29.1 - 29.2&lt;br&gt;• Watch Dark Energy, A Brief History of the Universe</td>
<td>Early Universe&lt;br&gt;• Read 29.3 - 29.4&lt;br&gt;• Watch Picture of the Big Bang</td>
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<td>10</td>
<td>11/27 - 12/1</td>
<td>Fate of the Universe&lt;br&gt;• Read 29.5 - 29.7&lt;br&gt;• Watch Why is the Universe Flat?, Deep Time</td>
<td>Final Review&lt;br&gt;Quiz 4: Universe Evolution (Weeks 8-10)</td>
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</tbody>
</table>

**Final Exam:** Monday, December 4, 10:15 am - 12:15 pm