University of Wyoming
ASTR 1000
Descriptive Astronomy, 3 credits
Classroom building room 214
Spring semester 2026

Class times

MWF 9:00–9:50 AM, from 20 Jan 2025 to 8 May 2025 excluding university breaks.

Instructor

Richard Barrans, Ph.D., M.Ed., Assistant Lecturer, Physics and Astronomy
Physical Science Building room 116, no phone in office, rbarrans@uwyo.edu
Office Hours: M 3:10–4:10 PM, T 1–2 PM; W 7–8 PM; F 10–11 AM. The Wednesday evening office hours are held in PS 234. All other hours are in my office, PS 116.

Enrollment restrictions

Students who have taken ASTR 2310 may not earn credit in ASTR 1000, and not more than 4 credit hours may be earned by taking both ASTR 1000 and ASTR 1050.

Course description

Covers essential features of the solar system, stellar astronomy and time measurement. This course is designed primarily for non-science majors. The rewards are intrinsic—the Universe is astonishing, and doubly so if you appreciate how we have learned about it.

University Studies Program

This course fulfills the Physical and Natural World (PN) requirement of the 2015 University Studies Program. Physical and Natural World (PN) courses will help students understand the fundamental concepts of scientific and quantitative inquiry and develop the ability to understand the fundamental concepts of scientific and quantitative inquiry and develop the ability to understand the relevance of scientific, technological, and quantitative skills to contemporary society. Physical and Natural World (PN) courses will also develop and promote critical and creative thinking skills through active learning, inquiry of pressing issues, and individual and collaborative processing of ideas.

Student learning outcomes

Physics & Natural World Student Learning Outcomes

- Understand the principles of the scientific method.
- Formulate and test ideas through analysis and interpretation of the data.
- Use quantitative data analysis as the basis for making critical judgements and drawing conclusions.

Physics & Natural World Critical & Creative Thinking Student Learning Outcomes

- Separate facts from inferences and relevant from irrelevant information, and explain the limitations of information.
- Evaluate the credibility, accuracy, and reliability of conclusions drawn from information.
- Analyze one's own and others' assumptions and evaluate the relevance of context when presenting a position.

Astronomy Student Learning Outcomes

- Identify and describe the contents of the Universe.
- Identify and explain evidence leading to our ideas of what exists and how it behaves.

Required materials

Textbook: Bennett, Donahue, Schneider, and Voit, *The Essential Cosmic Perspective*, 9th Ed. Pearson, 2022, with MasteringAstronomy. Available via WyoCourses through StartRight+.

Internet: Course information and lecture outlines will be accessible through WyoCourses. Supplemental materials, such as lecture slide shows and worksheets, can also be accessed directly at my website, www.barransclass.com, in case the links in WyoCourses are missing or incorrect.

General requirements and expectations for the course

Attendance is not required in lecture; however, nominal credit is awarded for in-class activities. The more actively engaged you are in class, the better you will learn and perform. It is best to read the assigned chapters before lecture.

Late work: Late **homework** assignments are not penalized; avoid letting work pile up at the end of the semester by completing them by their scheduled due dates. Because **"part" projects** must be viewed by fellow students at scheduled times, drafts receive zero credit if not submitted by their deadlines, feedback on classmates' drafts and final projects is not accepted (no credit) late, and final projects are docked ten points if not submitted by their deadlines. **À la carte activities** don't have due dates, but no student may submit more activities than there are class days left in the term.

Required examinations, assignments, and activities

Homework

Assignments will be posted online via the MasteringAstronomy platform, accessible through the WyoCourses course shell. The submission deadline for each homework will usually be a week after the homework is assigned (not at midnight). Homework assignments are graded for completion. Do the homework and get full credit, even if you don't get all the answers correct. (Learn the correct answers, though.)

"Part" projects

The textbook clusters the chapters into six thematic "parts." For each "part" one through five, every student will create a project demonstrating mastery of the included topics. At the beginning of each "part," I will distribute a list of potential projects; students are also encouraged to propose their own ideas. Each part project comprises four deliverables: a draft, feedback on classmates' drafts, a final project, and feedback on classmates' final projects.

À la carte activities

For full points in the course, students must complete additional activities. Students choose from activities such as asking questions in class, attending a planetarium show, reporting on a book about astronomy, or constructing a 3-D model of a constellation. Students may also propose activities I haven't thought of; we'll negotiate what they're worth.

Final

The final exam is on Wednesday of finals week. It will be comprehensive, though material from part six of the textbook is more heavily weighted because there is no project for it.

Required participation outside of class meetings

Some of the à la carte activities require participation in events scheduled outside of regular class hours. If you choose one of those activities, you'll need to be present.

Grading scale and grading policy

The final grade will be determined from the fraction of standards satisfied. Grading will be on a standard scale (90's = A, 80's = B, 70's = C, 60's = D, < 60% = F). Grades are computed from the following items:

In-class activities	5%
Homework	10%
"Part" projects	50%
À la carte activities	20%
Final exam	15%

In-class activities receive full credit if the work addresses the prompt. Homework receives full credit if it is completed. The draft and feedback sections of "part" projects receive full credit if submitted on time and if they contain the required materials; students grade their own final projects in consultation with the instructor. À la carte activities receive full credit if they contain all the required parts.

A note about grades: Your grade in this course reflects your performance over a 15-week period on a limited set of assessments. It is not a prediction of your future success or an evaluation of your career potential. It does not reflect your worth as a person or what I think of you.

Attendance and absence policy

Attendance in lecture is expected, but there is no explicit grade for attendance. You must be present, or have an excused absence, to receive credit for class work.

Classroom behavior policy

Students are expected to respect others' opinions and abilities, and to help each other during group work activities. Those who repeatedly disrupt the class or interfere with other students' opportunity to learn will be asked to leave the class. If you have a cell phone or any personal audio or video equipment, ensure that it does not make noise during class, and that it does not create a distraction for your classmates or the instructor. Laptops and tablets are allowed for note-talking purposes. To protect the privacy of your fellow students, no unauthorized video or audio recording during class is allowed. If you require recording for accommodation of disabilities, work with Disability Support Services and me to accommodate your needs.

Pursuant to Wyoming state law, individuals who possess a valid concealed carry permit issued by the State of Wyoming may carry a concealed handgun on the University of Wyoming campus, except in designated restricted areas as defined by law and institutional policy. Permit holders are solely responsible for understanding and complying with all applicable federal, state, and local laws, as well as University of Wyoming regulations. Firearms must remain fully concealed and secured in a holster on the permit holder's body, or within a personal carrier (e.g., backpack, purse) that remains under the permit holder's immediate and continuous control at all times. If participation in course-related activities prevents the permit holder from maintaining exclusive control of their concealed firearm, it is their responsibility to make appropriate arrangements prior to attending class.

Academic Freedom and Institutional Discrimination

UW Regulation 2-15 on Academic Freedom states, "Academic freedom in teaching protects the rights of Academic Personnel to teach according to their expertise. Academic Personnel are entitled to freedom in discussing their subject. Academic Personnel have a responsibility to ensure that their teaching is effective and consistent with the standards of the discipline, understanding that disciplines may have diverse points of view on any given subject. Teaching may involve controversial material; however, with academic freedom in the classroom, Academic Personnel also have the responsibility to respect others' freedom to express disagreement and alternate opinions." Additionally, "Academic freedom does not negate the rights of students and the public to disagree with Academic Personnel's work, although students are expected to learn material with which they may disagree." Also adopted by UW in its Academic Freedom policy, "Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled."

Classroom statement on diversity

The University of Wyoming values an educational environment that supports students of all backgrounds and viewpoints. Diversity of viewpoints is considered a resource for learning.

Topics may be difficult, not only intellectually but emotionally; however, discussions are essential to meeting the course's student learning outcomes and assisting students in developing problem-solving and critical-thinking skills. During all conversations, respect and civility are of utmost importance.

Disability support

The University of Wyoming is committed to providing equitable access to learning opportunities for all students. If you have a disability, including but not limited to physical, learning, sensory or psychological disabilities, and would like to request accommodations in this course due to your disability, please register with and provide documentation of your disability as soon as possible to Disability Support Services (DSS), Room 128 Knight Hall. You may also contact DSS at (307) 766-3073 or udss@uwyo.edu. It is in the student's best interest to request accommodations within the first week of classes, understanding that accommodations are not retroactive. Visit the DSS website for more information at: www.uwyo.edu/udss. Once UDSS informs me of the accommodations appropriate for you, I will implement them.

Academic dishonesty policy

Academic honesty develops respect between faculty and students, ensures fair and effective grading, and creates an environment that fosters learning.

Academic dishonesty will not be tolerated in this class. Cases of academic dishonesty will be treated in accordance with UW Regulation 2-114. The penalties for academic dishonesty can include, at my discretion, an "F" on an exam, an "F" on the class component exercise, and/or an "F" in the entire course. Academic dishonesty means anything that represents someone else's ideas as your own without attribution. It is intellectual theft — stealing — and includes (but is not limited to) unapproved assistance on examinations, plagiarism (use of any amount of another person's writings, blog posts, publications, and other materials without attributing that material to that person with citations), or fabrication of referenced information. Facilitation of another person's academic dishonesty is also considered academic dishonesty and will be treated identically.

Astronomy is fun. Involvement in a case of academic dishonesty is not fun.

AI technology

Students are permitted to use advanced automated artificial intelligence or machine learning tools on assignments in this course if that use is properly documented and credited. For example, text generated by ChatGPT-5 should include a citation such as "GPT-5 Thinking." (YYYY, Month DD of query). "Text of your query." https://chat.openai.com/" Material generated using other tools should follow a similar citation convention.

Duty to report

UW faculty are committed to supporting students and upholding the University's non-discrimination policy. Under Title IX, discrimination based upon sex and gender is prohibited. If you experience an incident of sex- or gender-based discrimination, we encourage you to report it. While you may talk to a faculty member, understand that as a

"Responsible Employee" of the University, the faculty member MUST report information you share about the incident to the university's Title IX Coordinator (you may choose whether you or anyone involved is identified by name). If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are people who can meet with you. Faculty can help direct you or you may find info about UW policy and resources at http://www.uwyo.edu/reportit.

You do not have to go through the experience alone. Assistance and resources are available, and you are not required to make a formal complaint or participate in an investigation to access them.

Green Dot program at UW

Here at The University of Wyoming, we are committed to reducing and preventing power-based personal violence such as sexual assault, relationship violence, and stalking. Green Dot is a bystander intervention program to reduce these forms of violence with one thought; If everyone does one thing, no one will have to do everything. A Green Dot is your choice at any moment to make campus safer by promoting safety for everyone and letting others know that you will not tolerate violence. A Green Dot is any behavior, choice, word or attitude that sends a clear message that:

1. Violence is not okay with you, and
2. Everyone is expected to do their part.

Additional information on Green Dot training and resources are available at http://www.uwyo.edu/greendot/.

Substantive changes to syllabus

Information in the syllabus was, to the best knowledge of the instructor, correct when distributed at the beginning of the term. The instructor, however, reserves the right, acting within the policies and procedures of the University of Wyoming, to make changes in the course content, schedule, or instructional techniques during the term. If any changes to the syllabus become necessary, students will be notified in class, by email, and on WyoCourses. Please check your university email daily.

Student Resources:

- DISABILITY SUPPORT SERVICES: udss@uwyo.edu, 766-3073, 128 Knight Hall, www.uwyo.edu/udss
- COUNSELING CENTER: uccstaff@uwyo.edu, 766-2187, 766-8989 (After hours), 341 Knight Hall, www.uwyo.edu/ucc
- ACADEMIC AFFAIRS: 766-4286, 312 Old Main, www.uwyo.edu/acadaffairs
- DEAN OF STUDENTS OFFICE: dos@uwyo.edu, 766-3296, 128 Knight Hall, www.uwyo.edu/dos
- UW POLICE DEPARTMENT: uwpd@uwyo.edu, 766-5179, 1426 E Flint St, www.uwyo.edu/uwpd
- STUDENT CODE OF CONDUCT WEBSITE: www.uwyo.edu/dos/conduct
- UW TUTORING RESOURCES: www.uwyo.edu/step/index.html

Tentative schedule

"Tentative" because unscheduled things come up, such as student presentations and guest speakers. But I'll try to adhere to the schedule, and to get back on track if anything happens.

Date	Topic	Reading*	Projects
01/21	Syllabus, Space is big and empty		
01/23	What's out there	1.1	
01/26	Moving through Space	1.2–1.3	
01/28	The changing sky	2.1–2.2	PI sign up
01/30	Special events	2.3–2.4	
02/02	History of astronomy	Ch 3	
02/04	Force and motion	4.1–4.2	
02/06	Conservation laws and gravity	4.3–4.4	PI draft
02/09	Electromagnetic radiation	5.1–5.2	
02/11	Black body radiation, Doppler effect	5.2	PI draft fb, PII sign up
02/13	Special relativity	none	PI final
02/16	**No class**		
02/18	Optics	5.3	PI final fb
02/20	Telescopes, non-visible observation	5.3	
02/23	Non-EM data, Solar system overview	5.3, Ch 6	
02/25	Solar system	Ch 6	PII draft
02/27	Earth and Moon	7.1–2, 7.5	PII draft fb
03/02	Mercury	7.2	
03/03	Total lunar eclipse 4:04–5:02 AM		
03/04	Mars	7.3	PII final
03/06	Venus	7.4	PII final fb, PIII sign up
03/09	Jupiter and Saturn	8.1	
03/11	Uranus and Neptune	8.1	
03/13	Icy satellites	8.2	PIII draft
	Spring Break 3/16–3/20		
03/23	Solar System fragments	Ch 9	
03/25	Exoplanets	Ch 10	PIII draft fb
03/27	Sun's surface and atmosphere	11.1	
03/30	Sun's interior	11.2–11.3	PIII final

04/01	Types of stars	12.1–12.2	PIII final fb
04/03	Stars that fade	13.1–13.2	PIV sign up
04/06	Stars that collapse	13.3–13.4	
04/08	Stellar remnants	14.1–14.2	
04/10	Black holes	14.3–14.4	
04/13	Our Galaxy	Ch 15	PIV draft
04/15	Galaxy structure	16.1	PIV draft fb
04/17	**No class**		
04/20	Galaxy structure	16.2	PV sign up
04/22	Galaxy formation and evolution	16.3	PIV final
04/24	Active galaxies	16.4	PIV final fb
04/27	Big bang	17.1–17.2	PV draft
04/29	What next?	Ch 18	PV draft fb
05/01	Extraterrestrial life	Ch 19	
05/04			PV final
05/06			PV final fb
05/08	Review		
05/13	**Final Exam 8:00–10:00 AM**		

*Reading assignments are from the textbook.