

**University of Wyoming**  
**ASTR 1000**  
**Descriptive Astronomy, 3 credits**  
**Classroom building room 214**  
**Spring semester 2025**

## **Class times**

MWF 9:00–9:50 AM, from 21 Jan 2025 to 9 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 12–1 PM; F 10–11 AM

## **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*, 9<sup>th</sup> Ed. Pearson, 2022, with MasteringAstronomy. Available via WyoCourses through StartRight+.

## **General requirements and expectations for the course**

### ***Lecture***

Since ideas and definitions from the text will be used freely in class, it is best to read and study the assigned chapters before class. The more actively engaged you are in class, the better you will learn and perform.

### ***Homework***

Homework is for learning and practice; it is not considered in calculating the course grade. The assignments will be posted online via the MasteringAstronomy platform. Students are encouraged to work together, but each student must submit their own work. The deadline for each homework will be indicated, typically right before the class at which the next homework is assigned. Please check and be mindful of the submission deadlines; they typically won't be at midnight.

### ***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](http://www.barransclass.com), in case the links in WyoCourses are missing or incorrect.

## **Required examinations, assignments, and activities**

Homeworks will be assigned approximately weekly. There will be four exams, including the final exam, held at the following times:

Exam 1	Friday, Feb 14
Exam 2	Friday, Mar 14

Exam 4                                      Wednesday, Apr 16  
Exam 4 (Final exam)      Friday, May 16                      8–10 AM

## **Required participation outside of class meetings**

When weather permits, there will be opportunities to observe the night sky outside of normal class hours. Attendance will not be considered in calculating the course grade. Missed standards must be made up on your own time, optimally during my office hours.

## **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).

**Standards:** Standards are specific skills that I recognize as evidence of mastery of the course content. The list of standards can be viewed from the WyoCourses shell. The midterm exams and the final exam contain questions that probe your understanding of the standards assessed. Your performance on the questions probing a standard determines whether you satisfy the standard or not. If you satisfy a standard, great! That contributes to your tally of mastered standards.

If you don't satisfy a standard on an exam, you automatically qualify to try again. If you satisfy the standard at the retest, it counts as satisfied with no penalty. If you don't satisfy the standard at the retest, you may retest again, but you must first meet with me or a designee to review the standard and schedule the retest. No retests will be available after the final exam.

*A note about grades:* Your grade in this course reflects your performance over a 15-week period on a limited set of contrived evaluations. It does not reflect your worth as a person or what I think of you. Because of the scope of this course, and because it comprises only a small fraction of your college career, your grade is not a prediction of your future success or an evaluation of your career potential.

## **Attendance and absence policy**

Attendance in lecture is expected, but there is no explicit grade for attendance.

## **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 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-taking purposes. No unauthorized video or audio recording during class is allowed to protect the privacy of your fellow students. If you require recording for accommodation of disabilities, work with Disability Support Services and me to accommodate your needs.

## **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](mailto: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](http://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.

Physics 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-3 should include a citation such as "Chat-GPT-3. (YYYY, Month DD of query). "Text of your query." Generated using OpenAI. <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](mailto:udss@uwyo.edu), 766-3073, 128 Knight Hall, [www.uwyo.edu/udss](http://www.uwyo.edu/udss)
- COUNSELING CENTER: [uccstaff@uwyo.edu](mailto:uccstaff@uwyo.edu), 766-2187, 766-8989 (After hours), 341 Knight Hall, [www.uwyo.edu/ucc](http://www.uwyo.edu/ucc)
- ACADEMIC AFFAIRS: 766-4286, 312 Old Main, [www.uwyo.edu/acadaffairs](http://www.uwyo.edu/acadaffairs)

- DEAN OF STUDENTS OFFICE: [dos@uwyo.edu](mailto:dos@uwyo.edu), 766-3296, 128 Knight Hall, [www.uwyo.edu/dos](http://www.uwyo.edu/dos)
- UW POLICE DEPARTMENT: [uwpd@uwyo.edu](mailto:uwpd@uwyo.edu), 766-5179, 1426 E Flint St, [www.uwyo.edu/uwpd](http://www.uwyo.edu/uwpd)
- STUDENT CODE OF CONDUCT WEBSITE: [www.uwyo.edu/dos/conduct](http://www.uwyo.edu/dos/conduct)

## Tentative schedule

Date	Topic	Reading*
01/22	Syllabus, Space is big	
01/24	What's out there	1.1
01/27	Moving through Space	1.2–1.3
01/29	The changing sky	2.1–2.2
01/31	Special events	2.3–2.4
02/03	History of astronomy	Ch 3
02/05	Force and motion	4.1–4.2
02/07	Fabric of existence: conservation laws and gravity	4.3–4.4
02/10	Electromagnetic radiation	5.1–5.2
02/12	Black body radiation, Doppler effect	5.2
02/14	<b>Exam 1</b>	
<b>02/17</b>	<b>No class</b>	
02/19	Optics	5.3
02/21	Telescope performance, non-visible observation	5.3
02/24	Non-EM observation, Solar system overview	5.3, Ch 6
02/26	Solar system overview	Ch 6
02/28	Earth and Moon	7.1–7.2, 7.5
03/03	Mercury	7.2
03/05	Mars	7.3
03/07	Venus	7.4
03/10	Giant planets	8.1
03/12	Icy satellites	8.2
03/14	<b>Exam 2</b>	
<b>Spring Break 3/17–3/21</b>		

03/24	Solar System fragments	Ch 9
03/26	Exoplanets	Ch 10
03/28	Sun's surface and atmosphere	11.1
03/31	Sun's interior	11.2–11.3
04/02	Observing stars	12.1
04/04	Classifying stars	12.2
04/07	Stars that fade	13.1–13.2
04/09	Stars that collapse	13.3–13.4
04/11	Stellar remnants	14.1–14.2
04/14	Black holes	14.3–14.4
04/16	<b>Exam 3</b>	
04/18	<b>No class</b>	
04/21	Our Galaxy	Ch 15
04/23	Galaxy structure	16.1–16.2
04/25	Galaxy formation and evolution	16.3
04/28	Active galaxies	16.4
04/30	Big bang	17.1–17.2
05/02	Ages of the Universe	
05/05	What next?	Ch 18
05/07	Extraterrestrial life	Ch 19
05/09	Review	
<b>05/16</b>	<b>Final Exam 8:00–10:00 AM</b>	

\*Reading assignments are from the textbook.