

Astronomy 126: Black Holes, Dark Matter, and the Universe  
Section 1, Spring 2026  
CS 311 @2:00 PM–3:15 PM, TR

**Instructor:** Dr. Robert (Bob) Berrington  
**Office:** CS 441  
**Phone:** (765) 285-8874  
**E-Mail:** rberring@bsu.edu  
**Office Hours:** 11:00 AM – 12:00 PM WF, or by appointment  
**Text Book:** *Stars, Galaxies, & Cosmology* by Bennett *et al.*, 8<sup>th</sup> or 9<sup>th</sup> edition

**Course Objectives:** This course is an introduction to and exploration of the nature of the life and death of stars and their remnants, and the nature and structure of the Universe itself. Topics covered will include stellar evolution, the special and general theory of relativity and its consequences, and current understandings (and unknowns/misunderstandings) into the nature and structure of the Universe.

**Homework Assignments:** A total of six homework assignments will be given throughout the course. The lowest homework assignment will be dropped. While I encourage students to collaborate on homework assignments, all work for this course must be your *own work* written in your *own words*. Assignments, unless otherwise noted, will be due two weeks from the day the assignment is handed out. Homework assignments will be accepted up to, but *not after* the due date.

**Participation:** Points for in-class participation will be given for the duration of the course. The points will be derived from involvement with in-class activities.

**Exams:** Throughout the course, I will give two mid-term exams. You will be allowed **1 hour for each mid-term exam**. Mid-term exams will be worth a total of 100 points each. The exam schedule is given in the following table, but may be subject to change if circumstances warrant. All tests will be given through Canvas. Because the tests are given online through Canvas, and over a range of dates, make-up tests will only be allowed in *extraordinary* circumstances.

Exam	Scheduled Dates
1	Thursday, February 19 ↔ Tuesday, February 24
2	Thursday, April 09 ↔ Tuesday, April 14

**Project:** A semester project will be given within the first week of classes. The project is designed to encourage exploration in the subjects covered within the class, and how it influences society. The semester project is not something that you will be able to work on at the last minute, and to encourage progress through out the semester there will be project proposal milestones that must be accomplished. *Those dates will be given in the semester project assignment in the Due Dates section.* All documents associated with the project proposal will be submitted online through Canvas.

**Grades:** The grades will be based on the total points acquired on the homework, class project, and exams. In the following table, I have summarized the points available over the

semester. The grading scale for the course will be curved, but will be no stricter than the following: 90-100 A, 80-90 B, 70-80 C, 60-70 D, and <60 F.

Item	Points Each	Total Points	Percentage of Total
Homework	40	200	36%
Participation	50	50	10%
Exam	100	200	36%
Project Components			
Initial Idea	15		
Formal Idea	35		
Presentation	50		
Project SubTotal	100	100	18%
Total Points		550	100%

**Schedule:** I have included a *tentative* schedule of the subjects to be covered in class. *The date given in the following table is the first day of the week (Monday) to indicate the week, and is not a class day nor does it represent due dates.* I have also included dates of exams, but not homework assignments. Please note that the schedule is *tentative*.

Week	Day	Chs.	Subjects	Assignments
1	01/05	1	Introduction, Our Place in the Universe	
2	01/12	4	A Universe of Matter & Energy	HW 1
3	01/19	5	Universal Motion: from Copernicus to Newton	
4	01/26	6	Light: The Cosmic Messenger	HW 2
5	02/02			
6	02/09	S2	Space & Time	HW 3
7	02/16	S3	Spacetime & Gravity	<b>Exam #1</b> , Initial Proj.
8	02/23	S3		HW 4
9	03/02	—	<b>Spring Break!</b>	<b>Party!</b>
10	03/09	14-15	Stars	
11	03/16	18	The Bizarre Stellar Graveyard	HW 5
12	03/23	19-20	Galaxies: The Foundation of Modern Cosmology	Proj. Prop.
13	03/30	23	Dark Matter, Dark Energy, and Cosmology	HW 6
14	04/06			<b>Exam #2</b>
15	04/13		Student Presentations	
16	04/20		Student Presentations	
17	04/27		<b>Finals Week!</b>	

**Attendance Policy:** Technically there is none. However, I do expect all students to attend and be prepared for all classes. Your attendance along with your participation in class discussions will make up a significant component of your *Participation grade*. That means having read any materials to be covered during the class prior to the class meeting time. This also means that it will be the responsibility of the student to makeup for any material

covered in a missed class. *Nota Bene* (NB): Please note the aforementioned policy regarding late assignments.

*Academic Honesty:* Cheating is prohibited at Ball State University. Copying other peoples work without attribution is not permitted and may be subject to disciplinary measures.

*Students with Disabilities:* If you need adaptations or accommodations because of a disability, or if you have emergency medical information to share with me, please contact me as soon as possible. Ball State's Disabled Student Development office coordinates services for students with disabilities; documentation of a disability needs to be filed in that office before any accommodations can be provided. Disabled Student Development can be contacted at 765-285-5293 or dsd@bsu.edu.

*University Statement:* We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse.