

# HIST 305/ASTR 305 The History of Astronomy

Spring 2023

T-Th 2:00-3:15 pm

Location: See Schedule



## Dr. Jerry Jessee

CCC 467

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Office Hours: M & W 12:00 – 1:00, email for appt.

## Dr. Adriana Durbala

SCI B203

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Office hours: M 10-11 & 12-1, T 10-11, Th 1-2, F 9-10 , or by appt.

## Course Description:

This course takes a scientific and historical perspective on how past cultures (including “western” civilization) have come to understand the heavens and the universe. Students gain historical perspective by putting astronomical science in its historical context and analyzing how different peoples in different times have come to understand the heavens and the universe. Students also learn about astronomical traditions in different places across the world to gain an understanding of how different regions and cultures of the world have come to know and value their place in the cosmos. Taken together, this historical and global approach enables students to understand how science is a cultural endeavor, which fosters empathy for astronomical traditions sometimes different from modern astronomy.

The course is structured chronologically, beginning with prehistory, and ending with modern astronomical thought. But it is also thematic: we explore the role of astronomy in the scientific revolution, questions concerning cosmology and our place in the universe, the impact of society on astronomy and vice versa, to name but a few. To achieve these goals, the course is a roughly even mixture of lectures, in-class activities, and reading discussion. Thus, you will be required to take notes during lecture as well as actively participate in in-class activities and

discussion of various readings. You will not be successful in this class if you do not actively engage with these class activities. Because there are a number of students enrolled in this course, we have assigned you to a specific group (A or B) for the in-class activities/discussion component for this class. These groups will rotate every Thursday class (usually). You can find the rotation sequence in the schedule of classes below.

There are no prerequisites and you do need any background in astronomy, mathematics, or history to do well in this course. This course is, however, a 300-level course and the workload for it reflects expectations for upper-division readings and writing workloads.

### **Learning Outcomes:**

#### **Enduring Understandings:**

Astronomical science and human culture are inescapably intertwined.

#### **Course Objectives:**

Any engaged student who works assiduously in this course will be able to:

- 1) Describe modern astronomical theories and practices for generating scientific knowledge of the universe. (GA – LO2)
- 2) Analyze how a historical and global perspective on astronomy contributes to an understanding of science as a universal and culturally interconnected endeavor. (GA – LO2)
- 3) Use primary sources to analyze how past cultures/peoples have understood, interpreted, and valued astronomy. (HP – LO1)
- 4) Describe differences among interpretations of the past (HP – LO2)
- 5) Identify the key components found within one or more cultures that are distinct from those found in predominantly English-speaking cultures (GA – LO1)
- 6) Analyze the role of astronomy in institutional and cultural changes in one or more human societies over time. (HP-LO3)
- 7) Demonstrate curiosity and empathetic insight in analyzing the role of astronomy in shaping how various cultures (in different continents and at various epochs) understood their place in the cosmos (GA-LO3)

#### **GEP Category Learning Outcomes:**

##### Historical Perspectives

- Use primary sources as evidence to answer questions about historical change. HP – LO1
- Describe differences among interpretations of the past. HP – LO2

- Analyze institutional and cultural changes in one or more human societies over time. HP – LO3

#### Global Awareness

- Identify the key components found within one or more cultures that are distinct from those found in predominantly English-speaking cultures. GA – LO1
- Analyze key forces or processes that contribute to global interconnectedness, and their implications. GA – LO2
- Demonstrate curiosity and empathetic insight about diverse cultural perspectives. GA – LO3

#### **Required Readings:**

Anthony Aveni, *Stairway to the Stars*, John Wiley and Sons, 1997.

Available for text rental at the UWSP Bookstore.

Robert Poole, *Earthrise: How Man First Saw the Earth*, Yale University Press, 2008.

Available for text rental at the UWSP Bookstore.

John Christianson, *On Tycho's Island: Tycho Brahe, Science, and Culture in the Sixteenth Century* (abridged), Cambridge University Press, 2002.

Available for rental at the UWSP Bookstore.

*Canvas:* In addition to the books above, you will also be **required to read articles and bring them to class to discuss**. These will be available on Canvas. They are noted in the schedule below with an asterisk (\*).

Sometimes readings not included in the schedule below will be assigned during the in-class activities or lecture. You will be responsible for reading these and bringing them to the next class. **You must rent the books and bring them to class on the days we discuss them.** Students who fail to bring their readings to class for discussion will be docked points on their in-class assignments.

**Course Website:** <https://www.uwsp.edu/canvas/Pages/default.aspx>  
<https://uwsa.instructure.com/courses/571433>

Log on using your UWSP login and password. ***This website will be used for posting grades, lecture notes/comments, assignments, class announcements, library, and web resources, etc.***

**Assignments:**

*Quizzes:* There will be various quizzes throughout the semester during the Thursday breakout sessions. To account for illness and other unforeseen legitimate issues that may prevent you from attending class, you will be able to drop your lowest quiz from your final quiz grade. This will be done automatically through Canvas. Does this mean you should come to class consistently? Yes. Yes, it does. Quizzes will consist of in-class written as well as online Canvas quizzes. The Canvas quizzes will be announced in class. They will be timed and will be available only in a 24-hour window.

*In-Class Assignments:* There will be twelve in-class assignments (which, in some cases, may require you to complete them at home) associated with the in-class activities component of class. What these are and how to complete them will be discussed in class. To account for illness and other unforeseen legitimate issues that may prevent you from attending class, you will be able to drop your lowest assignment from your in-class assignment grade.

*Book Responses:* You will be required to write two written responses to two of the three required books for this course. These responses will be 2-3 pages in length and will require you to provide a critical analysis of how the text contributes to a historical understanding of astronomy. We will provide a set of guidelines for the response within the first couple weeks of class. Which books you will write on will be selected by us.

*Paper:* There will be a final paper assignment of 5-6 pages that will require you to describe modern astronomical theories and analyze how a historical perspective on astronomy contributes to an understanding of how science is part of human culture. We will provide a prompt around the middle of the semester.

*Final Exam:* There will be a cumulative final exam for this course on May 16th. It will be comprised of multiple-choice questions, short-answer identifications, and short essay(s).

**Grade Breakdown (weighted):**

Quizzes: 20%

In-Class Assignments: 20%

Response Papers (two) 20%

Final Paper: 20%

Final Exam: 20%

Total: 100%

**Grading Scale (percentage):**

A	93-100	B-	80-82	D+	67-69
A-	90-92	C+	77-79	D	60-66
B+	87-89	C	73-76	F	59 and below
B	83-86	C-	70-72		

## **Other Stuff:**

Attendance: We will record attendance for the lecture portion of this class. Students who miss 3 lectures will be docked a 1/3 of a grade from their final grade. Students who miss 5-6, 2/3rds of a grade, 7 a full grade, and so on. For example, if you were to earn a B in this class, but missed 3 classes, your final grade would be a B-.

In-Class Activities Component: As you will notice from the schedule below, a significant portion of this class is comprised of in-class activities (usually on Thursday). Students will be assigned a specific group (either A or B), which will determine where you are to go for the day (either astronomy in-class activity with Durbala or history in-class activity/discussion with Jessee). **Group A is ASTR 305 and Group B is HIST 305.** In-class activities will be on Thursdays from 2pm-3:15pm. You cannot change your section assignment. Where you are to be for the astronomy/history in-class activities can be found in the schedule below.

Plagiarism: For information on plagiarism, consult <https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx>. Go to UWSP Chapter 14, *Student Academic Disciplinary Procedures*, for the disciplinary possibilities if you are caught cheating. We will vigorously pursue all incidents of plagiarism. The essay will be checked for originality. Students are expected to maintain the highest standards of academic integrity.

Equal Educational Opportunities: If you have a learning or physical challenge which requires classroom accommodation, please contact the Disability Resource Center (Room 108 Collins Classroom Center) with your documentation as early as possible in the semester. They will then notify us, in a confidential memo, of the accommodations that will facilitate your success in the course. Phone: 715-346-3365, <https://www.uwsp.edu/disability-resource-center/>.

Writing/Reading Help: This is a reading and writing intensive course. If you need help you can visit the Tutoring-Learning Center at 234 Collins Classroom Center. They are there to help you with papers etc. This is totally free! Their webpage is <https://www3.uwsp.edu/tlc/Pages/writingReadingTutorials.aspx>. You can also call them to make an appointment at (715) 346-3568.

### In case of emergency:

In the event of a medical emergency call 9-1-1 or use Red Emergency Phone. Offer assistance if trained and willing to do so. Guide emergency responders to victim. See UWSP Emergency Procedures at <https://www3.uwsp.edu/emergency/Pages/emergency-procedures.aspx> for details on all emergency response at UW-Stevens Point.

### UWSP Service Desk:

The Office of Information Technology (IT) provides a Service Desk to assist students with connecting to the Campus Network, virus and spyware removal, file recovery, equipment loan, and computer repair. You can contact the Service Desk via email at [itsvdesk@uwsp.edu](mailto:itsvdesk@uwsp.edu) or at (715) 346-4357 (HELP) or visit: <https://www3.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx>

Final note: Common courtesy dictates that students attending a class should remain seated for the duration of class. While in class, students should refrain from using phones, music players, headphones, etc. and should also refrain from gossiping/chatting while the professor is lecturing, and other students are listening and taking notes. Students who consistently engage in this type of disruptive behavior will be asked to leave and will receive an email requesting a meeting with the professors before being admitted back to class.

## TENTATIVE SCHEDULE

**Note: Group A is ASTR 305**  
**Group B is HIST 305**

Week	Topics
<b>Unit I – Premodern Astronomy</b>	
<b>Week 1</b>	Tuesday – Course <b>Introduction</b> (A210 SCI)
Jan 23-27	Thursday – How Do Historians Study Science? Astronomical Knowledge Introduction – Planetarium – 2nd floor Science Building by the pendulum * Schiebinger, “Gender and Natural History.”
<b>Week 2</b>	Tuesday – Lecture on <b>Prehistory and the Heavens</b> (A210 SCI) * Ascher, “Models and Maps from the Marshall Islands.”
Jan 30- Feb 3	Thursday – Breakout 1: Group A – Astronomy Activity 1 (B204 SCI) - <i>Motions on the Celestial Sphere through the Eyes of Ancient Stargazers</i> Group B – History Activity 1 (A210 SCI) * Aveni, <i>Stairway to the Stars</i> , vii-92. * Schuster, “The Problem of ‘Whig History’ in the History of Science.
<b>Week 3</b>	Tuesday – Lecture on <b>Ancient Astronomy</b> (A210 SCI) * Lombardi, “Why is a minute divided into 60 seconds...”
Feb 6-10	Thursday – Breakout 1: Group A – History Activity 1 (A210 SCI) <i>Stairway to the Stars</i> , vii-92. * Schuster, “The Problem of ‘Whig History’ in the History of Science. Group B – Astronomy Activity 1 (B204 SCI) - <i>Motions on the Celestial Sphere through the Eyes of Ancient Stargazers</i>
<b>Week 4</b>	Tuesday – Lecture on <b>Classical and Pre-Columbian Astronomy</b> (A210 SCI) * Seife, “Nothing Doing: The Origin of Zero.” * Aveni, “Apocalypse Soon?”
Feb 13-17	Thursday – Breakout 2: Group A – Astronomy Activity 2 (B204 SCI) - <i>Measuring the Position of Stars and Sun in the Sky</i> Group B – History Activity 2 (A210 SCI) <i>Stairway to the Stars</i> (all)
<b>Week 5</b>	Tuesday – Canvas Lecture on <b>Medieval / Islamic Astronomy</b> (A210 SCI) * Saliba, “Greek Astronomy and the Medieval Arabic Tradition”
Feb 20-24	Thursday – Breakout 2: Group A – History Activity 2 (A210 SCI) <i>Stairway to the Stars</i> (all) Group B – Astronomy Activity 2 (B204 SCI) - <i>Measuring the Position of Stars and Sun in the Sky</i>

## Unit II – Astronomy and The Scientific Revolution

<b>Week 6</b>	Tuesday – Lecture on <b>Copernican “Revolution”</b> (A210 SCI) * Osiander, “Foreword” to Copernicus, <i>On the Revolution of the Heavenly Spheres</i> * Lindberg, “The Medieval Church Encounters the Classical Tradition.” * (Optional) North, “Copernicus’ Planetary Theory.”
Feb 27- Mar 3	Thursday – Breakout 3: Group A – Astronomy Activity 3 (B204 SCI) - <i>Phases of the Moon &amp; Eclipses and their Meaning to Different Cultures</i> Group B – History Activity 3 (A210 SCI) <i>On Tycho’s Island</i> (all)
<b>Week 7</b>	Tuesday – Lecture on <b>The Pre-Newtonians: Brahe, Kepler, and Galileo</b> (A210 SCI)
Mar 6-10	Thursday – Breakout 3: Group A – History Activity 3 (A210 SCI) <i>On Tycho’s Island</i> (all) Group B – Astronomy Activity 3 (B204 SCI) - <i>Phases of the Moon &amp; Eclipses and their Meaning to Different Cultures</i>
<b>Week 8</b>	Tuesday – Lecture on <b>Newtonian Physics and Astronomy</b> (A210 SCI) * Mcfadden, “Survival of the Wisest.” * Weinberg, “On God, Christianity and Islam.” * Jacobs, “Christianity and the Newtonian Worldview.” * (Optional) North, “The Rise of Physical Astronomy.”
Mar 13-17	Thursday – Breakout 4: Group A – Astronomy Activity 4 (B204 SCI) – <i>Galileo &amp; Telescopes</i> Group B – History Activity 4 (A210 SCI) * Selections from <i>Newton’s Apple and Other Myths about Science</i>
<b>Mar 18- 26 – Spring Break</b>	
<b>Week 9</b>	Tuesday – Lecture on <b>Telescopic Observations and New Findings in the Solar System</b> (A210 SCI)
Mar 27-31	Thursday – Breakout 4: Group A – History Activity 4 (A210 SCI) * Selections from <i>Newton’s Apple and Other Myths about Science</i> Group B – Astronomy Activity 4 (B204 SCI) – <i>Galileo &amp; Telescopes</i>
<b>Unit III – Modern Astronomy</b>	
<b>Week 10</b>	Tuesday – Lecture on <b>Milky Way as an Island Universe</b> (A210 SCI)
Apr 3-7	Thursday – Breakout 5: Group A – Astronomy Activity 5 (B204 SCI) - <i>Measuring the Mass of the Black Hole at the center of the Milky Way</i> * application of the Newtonian laws Group B – History Activity 5 (A210 SCI) <i>Earthrise</i> (all)
<b>Week 11</b>	Tuesday – Lecture on <b>Hubble and Cosmology</b> (A210 SCI)
Apr 10-14	Thursday – Breakout 5: Group A – History Activity 5 (A210 SCI) <i>Earthrise</i> (all) Group B – Astronomy Activity 5 (B204 SCI) - <i>Measuring the Mass of the Black Hole at the center of the Milky Way</i> * application of the Newtonian laws

<b>Week 12</b>	Tuesday – Lecture on <i>The Cold War and the Space Race</i> (A210 SCI) * Wolfe, “The Military-Industrial Complex.”
Apr 17-21	Thursday – Breakout 6: Group A – Astronomy Activity 6 – Planetarium or TBD Group B – History Activity 6 (A210 SCI) *McCray, “Amateur Scientists, the International Geophysical Year, and Fred Whipple”
<b>Week 13</b>	Tuesday – Lecture on <i>Theory of Relativity of Einstein</i> (A210 SCI)
Apr 24-28	Thursday – Breakout 6: Group A – History Activity 6 (A210 SCI) -*McCray, “Amateur Scientists, the International Geophysical Year, and Fred Whipple” Group B – Astronomy Activity 6 – Planetarium or TBD
<b>Week 14</b>	Tuesday – Lecture on <i>Astrobiology</i> (A210 SCI)
May 1-5	Thursday – Lecture on <i>Exoplanets / Astronomy and Space Exploration</i> (A210 SCI)
<b>Week 15</b>	Tuesday – Planetarium show Planetarium – 2nd floor Science Building by the pendulum
May 8-12	Thursday – Movie TBD & Wrap Up (A210 SCI) <b>Final paper due</b>
<b>May 16</b>	<b>FINAL EXAM - Tuesday, May 16</b> <b>8:00-10:00 am (A210 SCI)</b>

**\*Note: We reserve the right to alter this schedule of topics/activities for any reason.**