

HIST/ASTR 305 The History of Astronomy
Spring 2019
T-Th 2:00-3:15 pm
Location: See Schedule



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appt.
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Dr. Adriana Durbala
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Office Hours: M 2:00-3:00 pm; T 9:00-11:00 am;
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Course Description:

History of Astronomy is an interdisciplinary exploration of astronomy from ancient to modern times that integrates scientific principles and discoveries within a global and historical perspective. In this class, you will learn basic astronomical principles, ideas, and practices. You will also be able to situate astronomical science within its social and historical context. Our hope is that you will come away from this course with a better understanding of astronomical science and an appreciation for how astronomy was (and remains) a cultural endeavor.

The course takes the broad view of the history of astronomy. It 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 lecture, 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, which as you'll see below is significant. 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 (other than sophomore standing) and you do need any background in astronomy, mathematics, or history to do well in this course.

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.
- 2) Analyze how a historical perspective on astronomy contributes to an understanding of science as a cultural endeavor.
- 3) Analyze how past cultures/people have understood, interpreted, and valued astronomy.
- 4) Analyze the role of astronomy in shaping how various cultures have understood their place in the cosmos.

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.

David Munns, *A Single Sky: How and International Community Forged the Science of Radio Astronomy*, The MIT Press, 2012.

Available for purchase at the UWSP Bookstore or PDF download through the USWP library catalog website.

Desire2Learn (D2L): In addition to the books above, you will also be **required to read articles, print, and bring them to class to discuss**. These will be available on D2L. 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 purchase 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: <http://www.uwsp.edu/d2l/Pages/default.aspx>

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. Quizzes may not be made up in any circumstance. 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 D2L. Does this mean you should come to class consistently? Yes. Yes, it does. Quizzes will consist of in-class written as well as online D2L quizzes. The D2L 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. In-class assignments may not be made up in any circumstance. 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 four 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 14th. 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):

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|----|--------|----|-------|----|--------------|
| 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). Astronomy in-class activities will usually be held in the astronomy lab (Science Building B204), but also at times in the planetarium (right around the corner from the astro lab). History in-class activities/discussions will be held in the room A109 SCI. 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.

Electronics: All electronics must be turned off during class or put in silent mode, unless instructed by us to use them. These include cell phones, laptops, headsets, and tablets. In some cases an electronic device may be permitted if the student has an accommodation approved by the Disability Services Office (see 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 UWSP Disability and Assistive Technology Center (6th Floor of the Learning Resources 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. Voice: (715) 346-3365, TTY: (715) 346-3362, <http://www.uwsp.edu/disability/Pages/default.aspx>.

Writing/Reading Help: This is a reading and writing intensive course. If you need help you can visit the Tutoring and Learning Center in the basement of the Library. They are there to help you with papers etc. This is totally free! Their webpage is <http://www.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.

In the event of a tornado warning, proceed to the lowest level interior room without window exposure. See www.uwsp.edu/rmgt/Pages/em/procedures/other/floor-plans.aspx for floor plans showing severe weather shelters on campus. Avoid wide-span structures (gyms, pools or large classrooms).

In the event of a fire alarm, evacuate the building in a calm manner. Meet at DUC. Notify instructor or emergency command personnel of any missing individuals.

Active Shooter/Code React – Run/Escapes, Hide, Fight. If trapped hide, lock doors, turn off lights, spread out and remain quiet. Call 9-1-1 when it is safe to do so. Follow instructions of emergency responders.

See UW-Stevens Point Emergency Procedures at www.uwsp.edu/rmgt/Pages/em/procedures for details on all emergency response at UW-Stevens Point.

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, head phones, 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

| Week | Topics |
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| Unit I – Premodern Astronomy | |
| Week 1 | Tuesday – Course Introduction (SCI A109) |
| Jan 22-25 | Thursday – How Do Historians Study Science? Astronomical Knowledge Introduction – Planetarium – 2 nd floor Science Building by the pendulum * Schiebinger, “Gender and Natural History.” |
| Week 2 | Tuesday – Lecture on Prehistory and the Heavens (A109 SCI) * Ascher, “Models and Maps from the Marshall Islands.” |
| Jan 28- Feb 1 | 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 (A109 SCI) * Aveni, <i>Stairway to the Stars</i> , vii-92. * Schuster, “The Problem of ‘Whig History’ in the History of Science.” |
| Week 3 | Tuesday – Lecture on Ancient Astronomy (SCI A109) * Lombardi, “Why is a minute divided into 60 seconds...” |
| Feb 4-8 | Thursday – Breakout 1: Group A – History Activity 1 (SCI A109) <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> |
| Week 4 | Tuesday – Lecture on Classical and Pre-Columbian Astronomy (A109 SCI) * Seife, “Nothing Doing: The Origin of Zero.” * Aveni, “Apocalypse Soon?” |
| Feb 11-15 | Thursday – Breakout 2: Groups A & B – Astronomy Activity 2 (B204 SCI & Planetarium) - <i>Measuring the Position of Stars and Sun in the Sky</i> |
| Week 5 | Tuesday – Lecture on Medieval / Islamic Astronomy (A109 SCI) * Saliba, “Greek Astronomy and the Medieval Arabic Tradition” |
| Feb 18-22 | Thursday – Breakout 2: Groups A & B – History Activity 2 (A109 SCI) <i>Stairway to the Stars</i> (all) |
| Unit II – Astronomy and The Scientific Revolution | |
| Week 6 | Tuesday – Lecture on Copernican “Revolution” (A109 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 25- Mar 1 | Thursday – Breakout 3: Group A – Astronomy Activity 3 (B204 SCI) - <i>Phases of the Moon. Lincoln Almanac Trial</i> Group B – History Activity 3 (A109 SCI) <i>On Tycho’s Island</i> (all) |

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| Week 7 | Tuesday – Lecture on <i>The Pre-Newtonians: Brahe, Kepler, and Galileo</i> (A109 SCI) |
| Mar 4-8 | Thursday – Breakout 3: Group A –History Activity 3 (A109 SCI) <i>On Tycho’s Island</i> (all) Group B – Astronomy Activity 3 (B204 SCI) - <i>Phases of the Moon. Lincoln Almanac Trial</i> |
| Week 8 | Tuesday – Lecture on <i>Newtonian Physics and Astronomy</i> (A109 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 11-15 | Thursday – Breakout 4: Group A – Astronomy Activity 4 (B204 SCI) – Galileo & <i>Telescopes</i> Group B – History Activity 4 (A109 SCI) * Selections from <i>Newton’s Apple and Other Myths about Science</i> |
| Mar 16 - 24 – Spring Break | |
| Week 9 | Tuesday – Lecture on <i>Telescopic Observations and New Findings in the Solar System</i> (SCI A109) |
| Mar 25-29 | Thursday – Breakout 4: Group A – History Activity 4 (A109 SCI) * Selections from <i>Newton’s Apple and Other Myths about Science</i> Group B – Astronomy Activity 4 (B204 SCI) – Galileo & <i>Telescopes</i> |
| Unit III – Modern Astronomy | |
| Week 10 | Tuesday – Lecture on <i>Milky Way as an Island Universe</i> (SCI A109) |
| Apr 1-5 | 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 (A109 SCI) <i>Earthrise</i> (all) |
| Week 11 | Tuesday – Lecture on <i>Hubble and Cosmology</i> (A109 SCI) |
| Apr 8-12 | Thursday – Breakout 5: Group A – History Activity 5 (A109 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 |
| Week 12 | Tuesday – Lecture on <i>The Cold War and the Space Race</i> (A109 SCI) * Wolfe, “The Military-Industrial Complex.” |
| Apr 15-19 | Thursday – Breakout 6: Group A – Astronomy Activity 6 – Planetarium (B204 SCI) Group B – History Activity 6 (A109 SCI) <i>A Single Sky</i> (all) |
| Week 13 | Tuesday – Lecture on <i>Theory of Relativity of Einstein</i> (A109 SCI) |
| Apr 22-26 | Thursday – Breakout 6: Group A – History Activity 6 (A109 SCI) <i>A Single Sky</i> (all) Group B – Astronomy Activity 6 – Planetarium (B204 SCI) |

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| Week 14 | Tuesday – Lecture on <i>Astrobiology</i> (A109 SCI) |
| Apr 29 - May 3 | Thursday – Lecture on <i>Exoplanets</i> (A109 SCI) |
| Week 15 | Tuesday – Movie TBD Part I (A109 SCI) |
| May 6-10 | Thursday – Movie TBD Part II & Wrap Up (A109 SCI) Final paper due |
| May 14 | FINAL EXAM - Tuesday, May 14th 12:30-2:30 p.m. , A109 SCI |

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