ASTR 320
Philosophy and History of Astronomical Thought

Fall 2022

Tuesdays and Thursdays, 2:00-3:15 pm

SYLLABUS

Ver. 2
August 17, 2022

ASTR320 covers the History and Philosophy of Astronomy, from prehistorical times to the present. The story of astronomy is central to the history of science and to the history of thought in general. It plays a principal role in the narratives about this development as told by various historians with their differing philosophies and presumptions. We shall learn, using a "flipped classroom" format. Students will individually familiarize themselves with class material asynchronously, and we shall use our live online time for discussions and to work together on various assignments.

Course Syllabus: Your Roadmap to ASTR 320

Disappointment and misunderstanding often arise because of miscommunication of expectations. The goal of this document is to minimize such issues, serving as a "contract" between teachers and students.

Course modality

This class is scheduled to be taught in the *in person* modality.

Course Materials

There is **no required textbook** for this course. Material will be made available through D2L. Once you register in ASTR320 you will see the course appear under your Student Tab. It is where you go to know what to do.

Equipment and software requirements

For this class, during our classroom sessions and outside of them, you will need frequent access to a laptop; regular access to reliable internet signal; and the ability to download and run the following software: a web browser, a word processor, and Adobe Acrobat.

Instructor: Pavol "Paul" Gabor, S.J., Ph.D.
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Office: Steward Observatory, Room N209
Phone (office): (520) 621-6043 (please use voicemail)
Phone (cell): (520) 289-4167
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Dr. Gabor will respond to your emails within 24 hrs, Mon-Fri.

Course format

We shall use a "flipped classroom" format. There will be no lectures during our time together. Students will individually familiarize themselves with class material asynchronously in preparation for each class session. The pre-recorded presentations (Panopto) will be about 20 minutes long, and quiz questions will be inserted in the playback. Furthermore, in order to initiate (and document) an intellectual engagement with the material, each student will submit a substantive question on D2L, which will also help us start our in-class discussion.

Our common sessions on Tuesdays and Thursdays will be dedicated to discussions and other activities, some of which will resemble what in a traditional ("unflipped classroom") context would be homework. First we shall discuss the presentation you will have viewed in your own time prior to our common session. Then we shall work on small projects: hands-on online searches, determining the pedigree of information and ideas, reading texts and writing summaries or précis, learning about the academic publication process (peer reviewed journals, press releases, book reviews, etc.), cosmological and other philosophical presuppositions, the applicability limits in scientific statements, etc. There will be deliverables from these activities: Each student will submit a brief written report for each assignment.

Activities & Grading

Final grades for the course will be based on a simple sum of the points you earn for the various graded activities. The following table is my initial idea but it is still a work in progress:

ACTIVITY		#	@	**sub/total**
presentation with quiz (Panopto)	individual asynchronous online	24	0.5 pts	12 pts
discussion starter	individual asynchronous online	26	0.5 pts	13 pts
classroom work with texts, sources, etc.	common with individually written report	TBD	39 pts	39 pts
test	online synchronous	3	12 pts	36 pts
				100 pts

If your total is 90 points or greater your grade will be A, 80 to 89 points – B, 65 to 79 points – C, and 55 to 64 points – D. If your total is 54 points or less, you will not pass.

The requirements for written work and the assessment criteria are explained in appropriate rubrics.

Course Learning Outcomes

Upon completion of this course, students will be able to:

- understand the nature and application of physical science
- apply ideas and processes beyond the classroom
- recognize the complexity of many scientific issues
- recognize the historical and current relevance of ontology and epistemology
- speak and write about scientific knowledge
- critically analyze and interpret science information in mass media
- read and understand scientific literature from popular sources such as magazines and newspapers

Department of Astronomy Undergraduate Program Learning Outcomes:

1. Demonstrate the ability to meaningfully analyze, apply and integrate the principle findings, common applications, current problems, fundamental techniques, and underlying theory of the astronomy discipline.

2. Employ discipline skills related to the observational techniques, instrumentation, computational methods, and software applications used to investigate modern astrophysical phenomena and problems.

3. Develop proficiency with communicating, translating and interpreting fundamental astronomical concepts and research results in oral and/or written formats.

4. Conduct guided research and/or develop mastery-knowledge of a specific area of the discipline of astronomy.

5. Participate in the scholarly, ethical, and discipline specific practices of the field at an emergent level.

Course Goals & Objectives

Is our identity as individuals and as culture formed by our history? What is the role of science in the development of our civilization? What preconceived ideas (if any) is a given historian of science disseminating? What is cosmic and cosmological symbolism? How does it function within the collective unconscious? How does science interact with it? What is "real" and what matters to human societies? How do we reach an understanding of natural phenomena? What knowledge can we be certain about? Can certainty be quantified? What is the role of mathematics in physical sciences?

Astronomy throughout its history provided many crucial breakthroughs in our understanding of the world and of our place in it. We shall study them from the point of view of the history of thought, philosophy of science as well as historiography (construction of historical narratives).

During the course of the semester, we shall cover the story of astronomy from its prehistoric origins. The material will lead us to discuss:

1. the science underlying the material,
2. the historiography (how historians have written about it), and
3. the philosophical questions associated with it.

ASTR320 is designed with active learning in mind, i.e., it is guided by the principle that students learn more effectively when stimulated by classroom activities (as opposed to listening to lectures). In the process, you will also develop communication skills, quantitative literacy, critical-reasoning ability, and evidence-based problem-solving skills. Engaging in student-to-student discourse is a significant

component of this course. By working in groups, you will be stimulated to interpret, judge, synthesize and communicate, often across the differences in disciplines and backgrounds present within each group.

In preparation for each classroom session you will watch a Panopto video (about 20 minutes) with some quiz questions inserted in the playback. You will then think about the material, composing a discussion-starter question (don't worry, it will come to you quickly). You will then submit the discussion starter via Gradescope. (Gradescope makes providing feedback easier for me.)

In class, you will work in groups, going through some guided activities, discussing the material, etc. You will also work on some written assignments. You will collaborate in your group but each student will submit his or her write-up individually, again via Gradescope.

Course Schedule

Follow the D2L “Announcements.” Also see the D2L "Calendar" tool (remember to set "Display Options" >> "Course Events" appropriately). Course material and activities may not follow the exact dates indicated as set out at the beginning of the semester, with the notable exception of the three tests. The class sessions on Sep 22, Oct 27, and Dec 6, will consist of a test covering material from the previous nine sessions. It will take the form of a D2L Quiz, designed to assess your level of understanding of the material. Because of this, the tests are conducted in an **open-book** regime. Considering that this quiz is online by nature, your physical location will not matter. Note that your ASTR320 grades will be finalized without delay after Dec 6. There will be no ASTR320 test nor examination during finals’ week.

Statement on compliance with COVID-19 mitigation guidelines

As we enter the Fall semester, the health and wellbeing of everyone in this class is the highest priority. Accordingly, we are all required to follow the university guidelines on COVID-19 mitigation. Please visit www.covid19.arizona.edu for the latest guidance.

Attendance & Active Participation

- If you feel sick, or if you need to isolate or quarantine based on University protocols, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Notify your instructor(s) if you will be missing a course meeting or an assignment deadline.
- Non-attendance for any reason does **not** guarantee an automatic extension of due date or rescheduling of examinations/assessments.
    - Please communicate and coordinate any request directly with your instructor.
    - If you must miss the equivalent of more than one week of class, please contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.
- Voluntary, free, and convenient COVID-19 testing is available for students on Main Campus.
- If you test positive for COVID-19 and you are participating in on-campus activities, you must report your results to Campus Health. To learn more about the process for reporting a positive test, visit the Case Notification Protocol.
- The COVID-19 vaccine and boosters are available for all students at Campus Health.
- Visit the UArizona COVID-19 page for the most up-to-date information.

Academic advising

If you have questions about your academic progress this semester, please reach out to your academic advisor (https://advising.arizona.edu/advisors/major). Contact the Advising Resource Center (https://advising.arizona.edu/) for all general advising questions and referral assistance. Call 520-626-8667 or email to advising@arizona.edu.

Life challenges

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at (520) 621-2057 or DOS-deanofstudents@email.arizona.edu.

Physical and mental-health challenges

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

Class Recordings

For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies (Code of Academic Integrity and the Student Code of Conduct) are also subject to civil action.

Etiquette

Everyone in the class is expected to abide by and follow the UA's Student Code of Conduct public.azregents.edu/Policy Manual/5-308-Student Code of Conduct.pdf, and to refrain from disruptive behavior as outlined by the UA policy http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting.

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

UA Nondiscrimination and Anti-Harassment Policy

The University is committed to creating and maintaining an environment free of discrimination (policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy) and harassment (title-ix-policies).

Late Work

No credit will be given for late work. In order to be fair to those that turn in their work on time, late work will not be accepted. If you are concerned about not being able to turn in your work on the due date, please turn it in early! **Err on the side of prudence!** If you choose to wait until a few hours before the deadline to do your assignment, you are taking a risk. Should your printer break, internet go down, or an emergency arise, these will NOT be valid excuses.

Missed Tests

No makeup tests will be administered. The tests are already scheduled and posted on the class schedule. If you know that you will miss a test, for valid reasons, contact the instructor as soon as possible.

Makeup Credit?

Near the end of term, there will be no makeup or extra credit assignments. Do not expect to compensate for poor work at the end of the term with additional work.

Disputing Grades

You have one week from the time an assignment or exam is returned to challenge any perceived errors. Although rare, there are occasions when grading errors occur, and you should review your returned work.

Academic Honesty

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See code-academic-integrity. *Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent*. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, https://drc.arizona.edu) to establish reasonable accommodations.

Subject to Change Statement

Information contained in the course syllabus may be subject to change with advance notice, as deemed appropriate by the instructor.