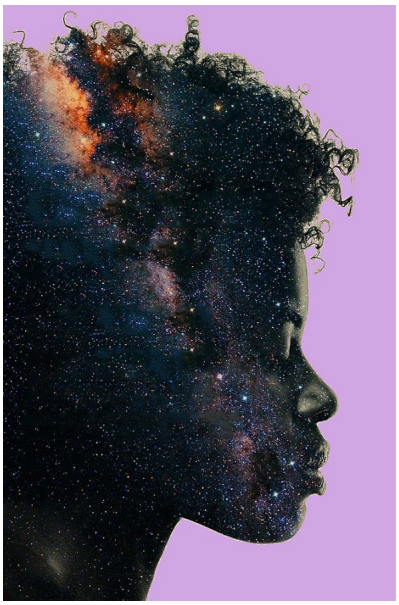


PHY-102

Astronomy, Cosmology, and Astrophysics

Lecture	Lab	Observatory
MWF	Tues OR Thur	Sun-Thur
9 - 9:50 AM	9– 9:50 AM	7-9 PM OR 8-10 PM (daylight/weather)
Olin 103	Olin 217	Olin 4th Floor

Course Description and Objectives

How did our Universe arise? Students will learn more than just the quantitative data, but also how our understanding of the science of space has developed. We ask questions like, what were the cultural and political atmospheres that led to how and why we have the understanding of the universe that exists today?

Designed for non-science students, this course covers two basic and related topics. The first acquaints the student with the methods of observational astronomy and the use of small astronomical telescopes. The second topic is concerned with the astrophysical evidence which forms the basis of cosmological theories of the nature and origin of the solar system, galaxies, and the universe. Included are discussions of habitable extrasolar planets, pulsars, space travel, general relativity, and the fate of the Universe.

Student Learning Outcomes

By the end of this class, students will be able to:

- Analyze enduring and contemporary questions or challenges from multiple disciplines, using qualitative and quantitative methods. **NTSCI**
- Use ethical, religious, or philosophical frameworks to evaluate their own and/or others' responses to this enduring or contemporary question or challenge. **NTSCI**
- Examine issues of cultural difference both locally and globally. **NTSCI**
- Communicate effectively in written, spoken, and creative expression with a variety of audiences. **NTSCI**

What is in this syllabus?

Dr. Darsa Donelan

Email: ddonelan@gustavus.edu

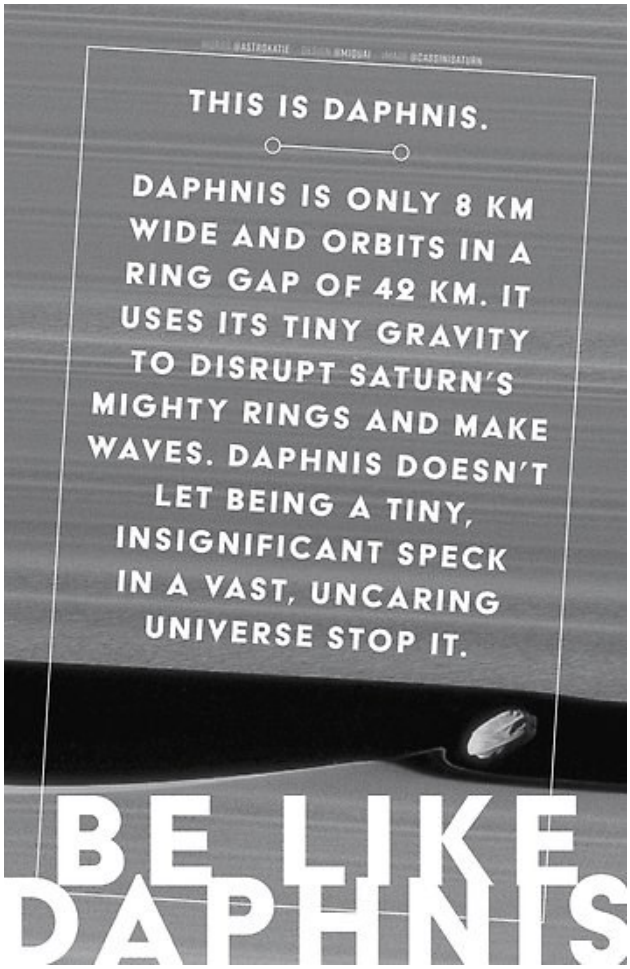
Office: Olin Hall 204

Office Hours: T 3-7 PM and R 5-7 PM in the CIE

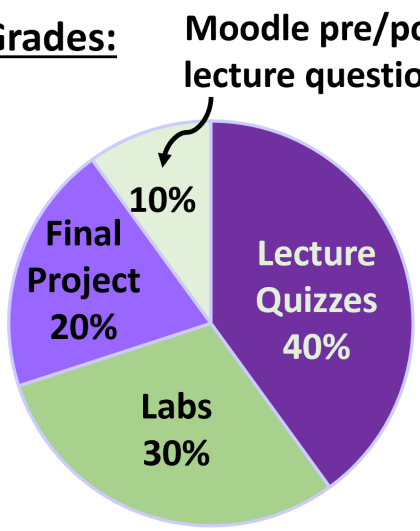
Open Door Policy:
Stop by my office at any time for discussion on course work or just to have a cup of tea and friendly conversation.

Requesting Accommodations

Gustavus Adolphus College is committed to ensuring equitable and inclusive learning environments for all students. If you have a disability and anticipate or experience barriers to equal access, please speak with the accessibility resources staff about your needs. A disability may include mental health, attentional, learning, chronic health, sensory, physical, and/or short-term conditions. Accessibility resources staff are located in the Academic Support Center (https://gustavus.edu/asc/accessibility/) (x7227). Accessibility Resources Coordinator, Corrie Odland (codland@gustavus.edu), can provide further information.



Grades:



94 – 100	A
90 – 94	A-
86 – 90	B+
82 – 86	B
78 – 82	B-
74 – 78	C+
70 – 74	C
66 – 70	C-
62 – 66	D+
58 – 62	D
0 - 58	F

Course Requirements

Lecture Attendance and Activities

The weekly class sessions are a main source of learning for the course. Please arrive to class on time and plan to stay for the entire session. There will be various lecture activities throughout the semester that are designed to give you an opportunity to apply the concepts we have been learning in class.

Laptop policy: All course documents will be posted on the course Moodle site, many of them contain images along with text. Please come to class prepare to take notes. You may use a laptop/tablet in class, but only to take notes or access class material. Do not use your laptop for gaming, visiting social media, etc. Remember, many individuals are distracted by glowing screens in their line of vision. I may ask that all devices be put away during some class sessions, so please come to class prepared with a pen and paper.

Remote Learning: If you are unable to attend class in person, please join through Zoom. A link will be provided via Moodle and Google calendar. Additionally, all lectures will be recorded and posted to YouTube for an asynchronous learning option.

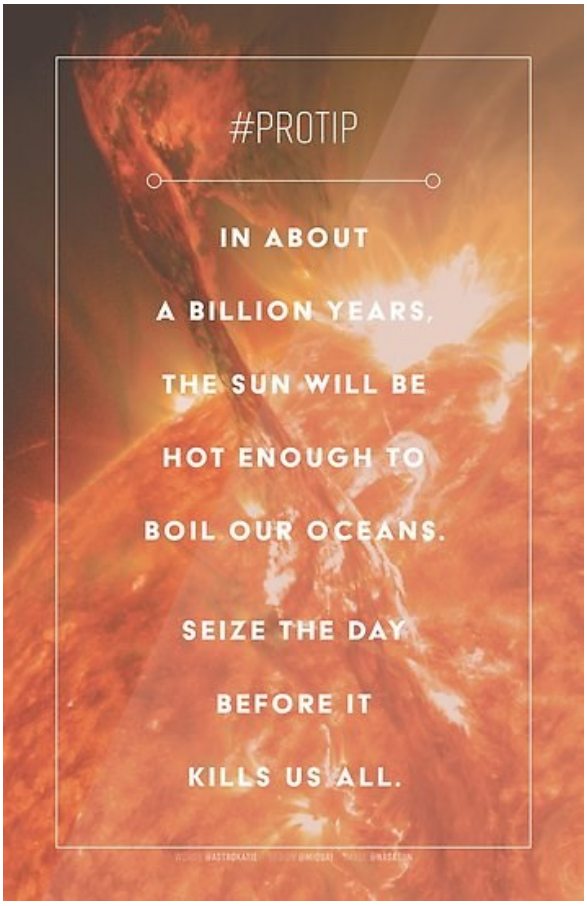
Course Requirements, cont.

Lecture Quizzes (40% of grade)

There will be lecture quizzes posted on Moodle after each lecture to access your understanding of the concepts covered that day. Lecture quizzes will be **due a week after they are assigned**. **Corrections will be allowed via office hours up to 2 weeks after quiz is posted.**

Moodle Pre/Post Lecture Questions (10%)

You should plan to complete assigned pre/post-lecture questions by **9AM before the class** session on which they are listed. Each set of questions will be posted as a Moodle quiz and contain educational videos and/or readings on which the questions will be based. Your answers to these question will help me update the content of my lectures as needed. Questions are **graded on completion** rather than accuracy. There will be approximately 2-3 of these questions each week. **70% of these question must be answered during the semester for full credit.**



Help & Resources

1. Multilingual Student Support

You can find support through the Center for International and Cultural Education's (https://gustavus.edu/cice/) Assistant Director of International Student and Scholar Services, Jeff Anderson (jeffa@gustavus.edu). Jeff can meet individually for tutoring in writing, consulting about specific assignments, and helping students connect with the College's support systems.

2. Mental Wellbeing

If you or someone you know expresses mental health concerns or experiences a stressful event that can create barriers to learning, Gustavus services are available to assist you, and include online options. You can learn more about the broad range of confidential health services available on campus at https://gustavus.edu/counseling/ and https://gustavus.edu/deanofstudents/services/.

Labs (30%)

Table top Labs: Attendance at lab experiments is required. Generally, the lab period will be enough for students to take necessary data, but additional work time may be needed outside of lab to finish the lab worksheet. **Worksheets will be due 1 week after each lab**.

Observing Labs: Each student will be required to complete **3 evening observing laboratory exercises** (plan for 1 due every 4 weeks, weather permitting). **Students must sign up on the Google signup sheet by the time the laboratory opens.** If you are not signed up, you may be turned away by the observatory TA if they are at capacity.

To accommodate those who may not be able to do in-person observing, we will also livestream a camera hooked up to our telescope as we are able to.

Observing labs are worth 2x as much as table top labs.

Help & Resources, cont.

3. Research Assistance

Students can always get help with research at the library. Reference librarians will help find information on a topic, develop search strategies for papers and projects, search library catalogs and databases, and provide assistance at every step. Drop-ins and appointments are both welcome. Visit https://gustavus.edu/library/reference_question.php for hours, location, and more information.

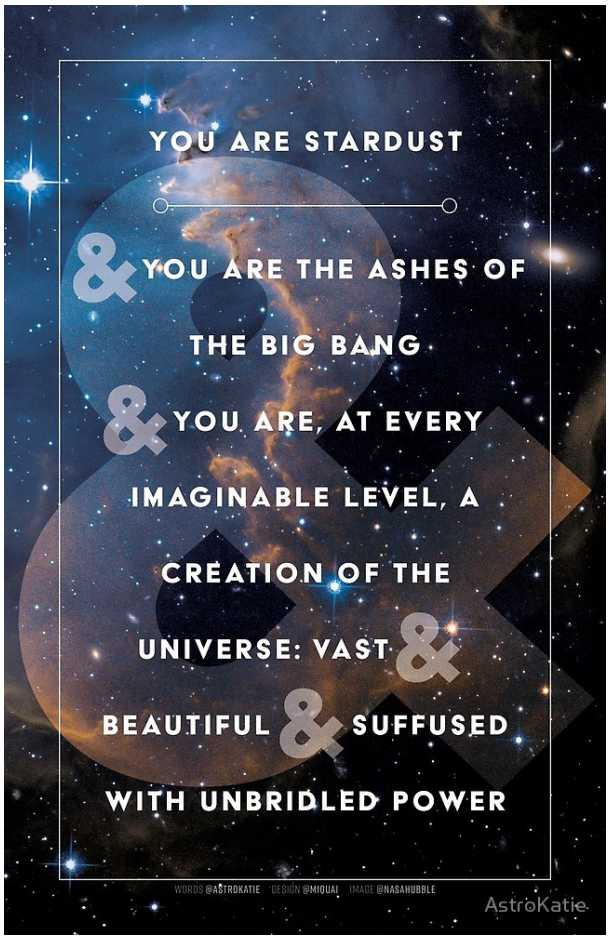
4. Title IX: Sexual Misconduct Prevention and Resources

Gustavus Adolphus College recognizes the dignity of all individuals and promotes respect for all people. As such, we are committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available; you can learn more online at https://gustavus.edu/titleix/.

Course Requirements, cont.

Final Project (20%)

For your course project, you will **relate topics of astronomy to your own major/minor** (or prospective major/minor). You can compose a 10 minute presentation, 1000-word essay, painting, music, one act play, financial analysis, computer simulation, etc. that presents your on your chosen topic, supports it with relevant evidence, and communicates it to a general audience. If you create a work of art, an artist statement will be required.



This project will be graded on **accuracy** of science, **clarity** of science for your peers, and **connection** to your major/minor. A grading rubric will be posted on Moodle.

Group projects will require my approval.

Course Policy

Academic Integrity

Learning in this class depends on you completing all individual assignments yourself and all required group assignments with your group.

Violations of academic integrity cheating, plagiarism, etc. will result in no credit for the assignment, course failure, and/or referral for disciplinary action. Using content generated by an artificial intelligence third-party service or site (AI-generated content) without proper attribution or authorization would also be a form of plagiarism.

Communication

If you have any general questions about the course that are not answered in this syllabus, please post a message under the #Q&A-for-Darsa channel in the course Discord. To discuss any individual issues with me, it is best to visit office hours to speak to me in person. You can also direct message me over Discord or by email.

Website

The course website can be found through Moodle (https://moodle.gac.edu/). The website includes access to course documents and links to course Discord forum and the course blog site.

Events	Location	Time
Lecture	**In-Person: Olin 103**	MWF 9 – 9:50 AM
	Online: Zoom [Link to meeting room on Moodle]	
Lab	**In-Person: Olin 217**	T or R 9 – 9:50 AM (attend registered section)
Observatory	In-person – 4th floor Olin Online – Remote imaging (must be requested in advance)	Selected evenings: Usually Sun-Thurs 7-9 PM or 8-10 PM (daylight and weather permitting)
FREE!!! Help Sessions w/ Darsa	**Center for Inclusive Excellence** Zoom (must request in advance)	T 3-7 PM and R 5-7 PM
Tutoring	**Olin 216**	Sun-Thurs 7-9 PM
Class Forum	**Discord** [Link on Moodle]	Available 24/7

Assessments	Where to find	Due
Lecture Tutorial Quizzes	Assignment: Moodle	1 week after assigned
	Corrections: Office Hours	2 weeks after assigned
Labs	Lab Manual: Moodle	Tabletop - 1 week after assigned Observing – Approx. 1 every 4 weeks
Pre/Post Lecture Questions	Moodle	9 AM before lecture *(Credit for completion)*
Final Project	Rubric on Moodle Upload to Moodle	Last week of classes

Course Schedule*

Week	Monday M	Tuesday T	Wednesday W	Thursday R	Friday F
1 / Feb 5	Course Intro.	Lab 1: Intro to Stellarium	Star Position	Lab 1: Intro to Stellarium	Star Motion
2 / Feb 12	Zodiac Constellations	Lab 2: Observation and Star Charts	Seasons	Lab 2: Observation and Star Charts	Moon Phases **ADD/DROP DEADLINE**
3 / Feb 19	Eclipses	Lab 3: Modeling Eclipses	Retrograde Motion	Lab 3: Modeling Eclipses	Kepler's 1st & 2nd Law
4 / Feb 26	Kepler's 3rd Law	Lab 4: The Moon's of Jupiter	Law of Gravitation	Lab 4: The Moon's of Jupiter	Gravitation Continued
5 / March 4	Electromagnetic Spectrum	Lab 5: Star Spectra Science	Luminosity, Temperature, and Size	Lab 5: Star Spectra Science	Blackbody Radiation
6 / March 11	Spectroscopy	Lab 6: Intro to Spectroscopy	Spectroscopy	Lab 6: Intro to Spectroscopy	Doppler Effect
7 / March 18	Intro to the Solar System	Lab 7: Modeling Planetary Magnetism	Sunspots	Lab 7: Modeling Planetary Magnetism	Planetary Geology
8 / March 25	No class - Spring Break	No Lab - Spring Break	No class - Spring Break **MIDTERM GRADES DUE**	No Lab - Spring Break	No class - Spring Break
9 / April 1	Planetary Atmosphere/ Greenhouse Gases	Lab 8: The Greenhouse Effect	Climate Change	Lab 8: The Greenhouse Effect	Solar System Formation
10 / April 8	**TOTAL SOLAR ECLIPSE** **(Peak @ 2 PM)** 	Lab 9: Exoplanet Atmospheres	Extrasolar Planets	Lab 9: Exoplanet Atmospheres	Star Brightness
11 / April 15	HR Diagram	Lab 10: Discovery of Extrasolar Planets	Star Formation and Lifetimes	Lab 10: Discovery of Extrasolar Planets	Stellar Evolution and Death **WITHDRAW DEADLINE**
12 / April 22	Black Holes and Gravitational Waves	Lab 11: The Lives of Stars	The Milky Way Galaxy and Dark Matter	Lab 11: The Lives of Stars	Galaxies and the Expanding Universe
13 / April 29	Hubble's Law	Lab 12: The Galaxy Zoo	The Big Bang	Lab 12: The Galaxy Zoo	The Fate of the Universe
14 / May 6	Special Topics	Lab 13: The Expanding Universe	Special Topics	Lab 13: The Expanding Universe	Special Topics
15 / May 13	**Project Presentations**	**Project Presentations**	**Project Presentations**	**Project Presentations**	No Class - Reading Day

***I reserve the right to revise at my discretion.**