



Stars and Stellar Systems (ASTR300)

Term: Spring/2023

Professor: Constantinos Kalapotharakos

Pronouns: he/him/his

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Office Hours: Monday & Wednesday, 10-11 am & 12:15-1:00 pm (ATL 1321) or through zoom by appointment

Credits: 3

Course Dates: From Jan 25, 2023 - May 10, 2023

Course Times: Monday & Wednesday, 11:00 am -12:15 pm

Classroom: ATL 1113

Teaching Assistant: Steven Shockley

Pronouns: he/they

Office Hours: Monday 1-2 pm & Tuesday, 11:30 am-12:30 pm (ATL 1243) or through zoom by appointment

Email: sshockle@umd.edu

Course Description

ASTR 300, Stars and Stellar Systems, is a 3-credit course primarily designed for non-science majors. To take this class, it is required that you have taken ASTR 100 or ASTR 101. The math skills required are those you should possess upon entry to the university and completing your core math requirement: algebra, scientific notation and units, and graph interpretation.

In ASTR 300, we begin by reviewing fundamental knowledge about the Universe, its scale and history, and the place of the Earth and Moon in it. We will discuss key concepts for astronomy, including Newton's laws, properties of light and matter, and telescopes. Even though we do not spend much time on the solar system and other planetary systems, we discuss exciting theories about the formation of the solar system. We take a deeper look at Nature, discussing fundamental physical concepts of the Cosmos, e.g., spacetime, general relativity, and the standard model, that have high applicability in Astrophysics. We discuss in detail about Sun, its interior, properties, and energy source. We generalize this detailed discussion for all the stars, including their collective properties, births, and deaths that lead to a collection of exotic astrophysical objects, e.g., white dwarfs, neutron stars, and black holes. Moreover, we examine our galaxy, i.e., Milky Way, and other galaxies emphasizing the galaxy evolution and the role of supermassive black holes. Finally, we discuss the birth and the fate of the Universe, examining exotic topics like the inflation of the Universe, dark matter, and dark energy.

Learning Outcomes

After successfully completing this course, you will be able to:

- Understand what our place in the Universe is.
- Understand and describe Newton's laws.
- Describe the properties of light and matter.
- Describe the basic properties of telescopes and the various types of telescopes.
- Describe theories of the formation of the Solar system.
- Describe the assumptions, properties, and astrophysical implications of special and general relativity.
- Describe the fundamental particles and forces in the Universe and the main principle of the quantum realm.
- Describe the energy source in the Sun and its activity.
- Describe the meaning of the Hertzsprung-Russell diagram and the role of mass on star life.
- Describe the stages of star birth.

- Describe the various types of compact objects, i.e., white dwarfs, neutron stars, and black holes.
- Describe the morphology and evolution of our galaxy and other galaxies.
- Describe Hubble's law.
- Describe the basic notions regarding the Big Bang theory.
- Describe the evidence that led to the notions of Dark Matter and Dark Energy.

Required Resources

- Course Website: elms.umd.edu
- Book: Essential Cosmic Perspective - Modified Mastering Astronomy by Bennett, Jeffrey O. / Donahue, Megan O. / Schneider, Nicholas / Voit, Mark (9780135795798) - 9TH edition
- Essential Cosmic Perspective - With MasteringAstronomy Access
- By purchasing Mastering, the cost will include the cost of the etext. For this title with Mastering, the cost is \$74.99 NET (approx. \$90 at the bookstore). With your purchase of Mastering, Pearson offers all students the option to purchase a printed, loose-leaf version of the text (at a discounted price, approx. \$45) if that is something you prefer.

Policies and Resources for Undergraduate Courses

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Course-Specific Policies

I expect you to make the responsible and respectful decision to refrain from using your cellphone in class. If you have critical communication to attend to, please excuse yourself and return when you are ready.

Course Guidelines

Names/Pronouns and Self-Identifications:

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to in this class, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). Keep in mind that the pronouns someone uses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, it is your choice whether to disclose how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Communication with Instructor:

Email: If you need to reach out and communicate with me, please email me at ckalapot@umd.edu. Please DO NOT email me with questions that are easily found in the syllabus or on ELMS (i.e. When is this assignment due? How much is it worth? etc.) but please DO reach out about personal, academic, and intellectual concerns/questions.

ELMS: I may send IMPORTANT announcements via ELMS messaging. You must make sure that your email & announcement notifications (including changes in assignments and/or due dates) are enabled in ELMS so you do not miss any messages. You are responsible for checking your email and Canvas/ELMS inbox with regular frequency.

Communication with Peers:

With a diversity of perspectives and experience, we may find ourselves in disagreement and/or debate with one another. As such, it is important that we agree to conduct ourselves in a professional manner and that we work together to foster and preserve a virtual classroom environment in which we can respectfully discuss and deliberate controversial questions. I encourage you to confidently exercise your right to free speech—bearing in mind, of course, that you will be expected to craft and defend arguments that support your position. Keep in mind, that free speech has its limit and this course is NOT the space for hate speech, harassment, and derogatory language. I will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued.

Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert me immediately if you feel threatened, dismissed, or silenced at any point during our semester together and/or if your engagement in discussion has been in some way hindered by the learning environment.

Major Assignments

Homework Assignments

- From MasteringAstronomy, one homework per week (50%).
- Directly at ELMS, one homework per week (50% of hw).
- The two lowest grades will be dropped.

Quizzes & Weekly Summaries

- Depending on time availability, small quizzes (<5 mins) at the end of the lectures.
- Multiple choice questions and small written assignment.
- To motivate you to participate and to be engaged during the class time.
- Just the participation gives you 50% of the quizzes grade. The other 50% comes from your answers.
- The 20% lowest grades (the exact number depends on the final number of quizzes) will be dropped.

Two Midterm Exams & One Final Exam

- The midterm exams will check specific parts of the course content while the final exam will check the entire course content.

Grading Structure

Assignment	Percentage %	Notes
Homework	30%	Two lowest grades dropped
Quizzes & Weekly Summaries	5%	20% lowest grades dropped
Participation	5%	20% lowest grades dropped
Midterm Exam (highest grade)	20%	This can be the 1 st or the 2 nd one
Midterm Exam (lowest grade)	10%	This can be the 1 st or the 2 nd one
Final Exam	30%	Tuesday, May 16, 8am – 10am
Total	100%	

Academic Integrity






The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the University of Maryland does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the University of Maryland.**

It is important to note that course assistance websites, such as CourseHero, or AI generated content are not permitted sources, unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might be inaccurate or biased and most importantly, relying on restricted sources will hamper your learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, students may naturally choose to use online forums for course-wide discussions (e.g., Group lists or chats) to discuss concepts in the course. However, collaboration on graded assignments is strictly prohibited unless otherwise stated. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, etc. Please visit the [Office of Undergraduate Studies' full list of campus-wide policies](#) and reach out if you have questions.

Finally, on each exam or assignment you must write out and sign the following pledge: ***"I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment."*** If you ever feel pressured to comply with someone else's academic integrity violation, please reach out to me straight away. Also, ***if you are ever unclear*** about acceptable levels of collaboration, ***please ask!*** To help you avoid unintentional violations, ***the***

following table lists levels of collaboration that are acceptable for each graded exercise. Each assignment will contain more specific information regarding acceptable levels of collaboration.

	 OPEN NOTES	 USE BOOK	 LEARN ONLINE	 COLLECT ANSWERS ONLINE	 Discuss with peers
Homework Assignments	✓	✓	✓	✗	✓
Quizzes & Weekly Summaries	✗	✗	✗	✗	✗
Midterm and Final Exams	✗	✗	✗	✗	✗

Grades

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet and discuss.

Late work will not be accepted for course credit so please plan to have it submitted well before the scheduled deadline. I am happy to discuss any of your grades with you, and if I have made a mistake, I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same as making the cut (89.99 ≠ 90.00). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs									
+	97.00%	+	87.00%	+	77.00%	+	67.00%	+	
A	94.00%	B	84.00%	C	74.00%	D	64.00%	F	<60.0%
-	90.00%	-	80.00%	-	70.00%	-	60.00%	-	

Course Outline

The format of this section will vary based on the design of your course and the semester, but our guidance is to aim for a clear and concise table that maps out all of the assignment assessments and deadlines and gives students a sense of the course's organization.

Lecture #	Date	Topic	Reading Material
1	1/25 (W)	A Modern View of the Universe, Discovering the Universe for Yourself, The Science of Astronomy	Ch. 1.1-1.3, 2.1-2.4, 3.2-3.3
2	1/30 (M)	Making Sense of the Universe: Understanding Motion, Energy, and Gravity (I)	Ch. 4.1-4.3
3	2/1 (W)	Making Sense of the Universe: Understanding Motion, Energy, and Gravity (II)	Ch. 4.4-4.5
4	2/6 (M)	Light and Matter: Reading Messages From the Cosmos (I)	Ch. 5.1-5.2
5	2/8 (W)	Light and Matter: Reading Messages From the Cosmos (II)	Ch. 5.3-5.4
6	2/13 (M)	Telescopes: Portals of Discovery	Ch. 6.1-6.4
7	2/15 (W)	Formation of the Solar System	Ch. 8 (selective)
8	2/20 (M)	Space and Time (I)	Ch. S2.1-S2.2
9	2/22 (W)	Space and Time (II)	Ch. S2.3-S2.4
10	2/27 (M)	Midterm Exam 1	---
11	3/1 (W)	Spacetime and Gravity	Ch. S3.1-S3.6
12	3/6 (M)	Building Blocks of the Universe	Ch. S4.1-S4.4
13	3/8 (W)	Sun (I)	Ch. 14.1-14.2
14	3/13 (M)	Sun (II)	Ch. 14.3
15	3/15 (W)	Surveying the Stars (I)	Ch. 15.1-15.2
---	3/20, 3/22	Spring Break	---
16	3/27 (M)	Surveying the Stars (II)	Ch. 15.3
17	3/29 (W)	Star Birth	Ch. 16.1-16.3
18	4/3 (M)	Star Stuff (I)	Ch. 17.1-17.2
19	4/5 (W)	Star Stuff (II)	Ch. 17.3-17.4
20	4/10 (M)	The Bizarre Stellar Graveyard (I)	Ch. 18.1-18.2

21	4/12 (W)	The Bizarre Stellar Graveyard (II)	Ch. 18.3-18.4
22	4/17 (M)	Midterm Exam 2	---
23	4/19 (W)	The Milky Way	Ch. 19.1-19.4
24	4/24 (M)	Galaxies and the Foundation of Modern Cosmology (I)	Ch. 20.1-20.2
25	4/26 (W)	Galaxies and the Foundation of Modern Cosmology (II)	Ch. 20.3
26	5/1 (M)	Galaxy Evolution (I)	Ch. 21.1-21.2
27	5/3 (W)	Galaxy Evolution (II)	Ch. 21.3-21.4
28	5/8 (M)	The Birth of the Universe	Ch. 22.1-22.4
29	5/10 (W)	Dark Matter, Dark Energy, and the Fate of the Universe	Ch. 23.1-23.4

Note: This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

Resources & Accommodations

Accessibility and Disability Services

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The [Accessibility & Disability Service \(ADS\)](#) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu. Information about [sharing your accommodations with instructors, note taking assistance](#) and more is available from the [Counseling Center](#).

Student Resources and Services

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit [UMD's Student Academic Support Services website](#) to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their communication skills (and improving their grade) by visiting [UMD's Writing Center](#) and schedule an appointment with the campus Writing Center.

You should also know there are a wide range of resources to support you with whatever you might need ([UMD's Student Resources and Services website](#) may help). If you feel it would be helpful to have someone to talk to, visit [UMD's Counseling Center](#) or [one of the many other mental health resources on campus](#).

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit [UMD's Division of Student Affairs website](#) for information about resources the campus offers you and let me know if I can help in any way.

Veteran Resources

UMD provides some additional supports to our student veterans. You can access those resources at the office of [Veteran Student life](#) and the [Counseling Center](#). Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.

Course Evaluation

Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the [Student Feedback on Course Experiences](#) to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

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