

# ASTR121-0101,0102: Introductory Astrophysics II - Stars and Beyond-Spring 2023

## svogel

### ASTR121 Syllabus (Spring 2023)

- Lectures are held Tuesdays & Thursdays from 11 am to 12:15 pm in <https://maps.umd.edu/map/index.html?&zoom=19&feature=building&name=226&basemap=detailed> ATL (<https://maps.umd.edu/map/index.html?&zoom=19&feature=building&name=224&basemap=detailed>) 2400 ([map](https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing)) <https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing>)
- Discussion Section meetings are held in ATL (<https://maps.umd.edu/map/index.html?&zoom=19&feature=building&name=224&basemap=detailed>) 2428 ([map](https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing)) <https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing>).
- Discussion meetings do not begin until Friday, February 3**
  - Discussion Section 0101 meets Fridays from 1:00 to 1:50 pm (TA: Jongwon Park)
  - Discussion Section 0102 meets Fridays from 2:00 to 2:50 pm (TA: Jongwon Park)
- Lab Section meetings are held in ATL (<https://maps.umd.edu/map/index.html?&zoom=19&feature=building&name=224&basemap=detailed>) 0224 ([map](https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing)) <https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing>). **Lab meetings begin Monday January 30.**
  - Lab Section 0101 meets Mondays from 11:00 am to 2:00 pm (TA: Fred Garcia)
  - Lab Section 0102 meets Mondays from 2:00 to 4:00 pm (TA: Orion Guiffreda)
- The required textbook is the [OpenStax Astronomy textbook, by Fraknoi, Morrison, and Wolff](https://openstax.org/details/books/astrometry) <https://openstax.org/details/books/astrometry>, available for free. See below for more information
- The instructor is Prof. [Stuart Vogel](http://www.astro.umd.edu/people/vogel.html) (<http://www.astro.umd.edu/people/vogel.html>):
  - Office: [PSC](http://maps.umd.edu/map/index.html?&Mode=Map&NoWelcome=True&logo=False&LocationType=Building&LocationName=415) (<http://maps.umd.edu/map/index.html?&Mode=Map&NoWelcome=True&logo=False&LocationType=Building&LocationName=415>) 1164 ([map](https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing)) <https://www.google.com/maps/d/edit?mid=1eOgUVSkh1CZmTMkuj97O9W22x6RE9k8Q&usp=sharing>)
  - Phone: 301-405-2134
  - Email: [svogel@umd.edu](mailto:svogel@umd.edu) (<mailto:svogel@umd.edu>); Please use [Piazza](https://umd.instructure.com/courses/1318846/external_tools/42711) ([https://umd.instructure.com/courses/1318846/external\\_tools/42711](https://umd.instructure.com/courses/1318846/external_tools/42711)) for questions other students might have or might be able to answer. For personal matters, send e-mail via Canvas mail - click on the [inbox icon in the navigation column on the left](https://umd.instructure.com/conversations#filter=type=inbox) (<https://umd.instructure.com/conversations#filter=type=inbox>) and compose a message.
  - Office hours: Wednesday 2:00-3:00 pm; Thursday 1:00-2:00 pm; Wednesday office hours will normally be Zoom-only. Thursday office hours will normally be both in-person and Zoom. The zoom link is found in the Zoom module for this Course in the menu to the left.
  - Pronouns: he/him/his
- The teaching assistant (TA) for both discussion sections is Jongwon Park <https://www.astro.umd.edu/people/jwpark.html>):
  - Office: PSC 1238
  - Email: [jwpark@astro.umd.edu](mailto:jwpark@astro.umd.edu) (<mailto:jwpark@astro.umd.edu>); Canvas messenger is best
  - Office hours: Fridays 9:00-11:00am or by appointment
  - Pronouns: he/him/his
  - The syllabus for the discussion section is available [TBD](https://umd.instructure.com/courses/1337453/files/71800947?wrap=1) (<https://umd.instructure.com/courses/1337453/files/71800947?wrap=1>) [↓](https://umd.instructure.com/courses/1337453/files/71800947/download?download_frd=1) ([https://umd.instructure.com/courses/1337453/files/71800947/download?download\\_frd=1](https://umd.instructure.com/courses/1337453/files/71800947/download?download_frd=1))
- The TAs for the lab sections are Fred Garcia and Orion Guiffreda:
  - Section 0101: Monday 11:00am - 1:00 pm
    - TA: Fred Garcia
    - Office: ATL 1243 (if I'm not there, check the UG Lounge: ATL 1220)
    - Office hours: Mondays 5:00 - 6:00 pm or by appointment
    - Email: [fgarcia4@umd.edu](mailto:fgarcia4@umd.edu) (<mailto:fgarcia4@umd.edu>); please use Piazza in the Labs folder except for personal matters.
    - Pronouns: he/him/his
    - The syllabus for the lab section is available [here](https://umd.instructure.com/courses/1337453/files/71767751?wrap=1) (<https://umd.instructure.com/courses/1337453/files/71767751?wrap=1>) [↓](https://umd.instructure.com/courses/1337453/files/71767751/download?download_frd=1) ([https://umd.instructure.com/courses/1337453/files/71767751/download?download\\_frd=1](https://umd.instructure.com/courses/1337453/files/71767751/download?download_frd=1)) .
  - Section 0102: Monday 2:00pm - 4:00 pm
    - TA: Orion Guiffreda
    - Office: ATL 1243

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except for personal matters.

- The syllabus for the lab section is available [here](https://umd.instructure.com/courses/1337453/files/71767751?wrap=1) (<https://umd.instructure.com/courses/1337453/files/71767751?wrap=1>) [↓](https://umd.instructure.com/courses/1337453/files/71767751/download?download_frd=1) ([https://umd.instructure.com/courses/1337453/files/71767751/download?download\\_frd=1](https://umd.instructure.com/courses/1337453/files/71767751/download?download_frd=1)) .
- Tutors (undergraduate majors) are available for the course. Their schedule is available

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 AM					
8:15 AM					
8:30 AM					
8:45 AM					
9:00 AM					
9:15 AM					
9:30 AM					
9:45 AM					
10:00 AM					
10:15 AM					
10:30 AM					
10:45 AM					
11:00 AM		ASTR121 Lecture		ASTR121 Lecture	Julia
11:15 AM					
11:30 AM					
11:45 AM			Rohan		
12:00 PM					
12:15 PM					
12:30 PM	Siobhan				
12:45 PM		Julia			
1:00 PM				Rohan	
1:15 PM					
1:30 PM	Fred				
1:45 PM					
2:00 PM					
2:15 PM					
2:30 PM					
2:45 PM					
3:00 PM					
3:15 PM					
3:30 PM	Brooke				
3:45 PM		Rohan	Brooke		
4:00 PM					
4:15 PM					
4:30 PM					
4:45 PM					
5:00 PM					
5:15 PM	Tobi	Yugadeep			
5:30 PM					
5:45 PM					
6:00 PM					
6:15 PM	Raina (Zoom)				
6:30 PM					
6:45 PM					

- o ([https://umd.instructure.com/courses/1265769/files/53714097/download?download\\_frd=1](https://umd.instructure.com/courses/1265769/files/53714097/download?download_frd=1)) Tutors can be found in ATL 1220 (see [map](https://www.google.com/maps/d/u/0/edit?mid=1D4lgSUX_4uFpGnBBh0O9a36Cv3vYusUO&ll=38.99102681450315%2C-76.94235204999995&z=18) ([https://www.google.com/maps/d/u/0/edit?mid=1D4lgSUX\\_4uFpGnBBh0O9a36Cv3vYusUO&ll=38.99102681450315%2C-76.94235204999995&z=18](https://www.google.com/maps/d/u/0/edit?mid=1D4lgSUX_4uFpGnBBh0O9a36Cv3vYusUO&ll=38.99102681450315%2C-76.94235204999995&z=18))); doors to ATL 1220 are sometimes closed even when students are in the room - just open the door, walk in, and ask where to find the tutor.

## Course Overview

ASTR 120/121 presents a broad introduction to the science of astronomy and astrophysics. It is a two-semester sequence with the first semester (ASTR120) concentrating on our solar system and exoplanet systems, and the second semester (ASTR121) focusing on stars, galaxies, and the universe in general. The intent of this course is to give students a solid background in the primary physical concepts relevant to astronomy and astrophysics, and a broad exposure to the astronomical universe. **This course is aimed at students who intend to major in astronomy.**

In addition to learning about our universe, a primary goal of this course is to develop scientific thinking and problem-solving abilities. Equations and numerical calculations will be a major component of this class. **A working knowledge of algebra, geometry, and trigonometry is essential for this class.** We will be using occasional introductory calculus this semester.

This course satisfies a 4-credit Physical Sciences Lab CORE component and a Distributive Studies (Natural Sciences) Lab component. Students must have completed ASTR 120 and MATH 140.

## Course Structure and Expectations

This course normally consists of two lectures, one two-hour lab period, and one discussion period each week.

The lectures are on Tuesdays and Thursdays from 11 am to 12:15 pm in ATL 2400 ([map](https://www.google.com/maps/d)).

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eneral questions and class discussion. You , apart from anything clearly indicated as

optional or bonus material, even if we do not cover it in lecture.

You will be provided with a voting card for class participation that you must bring to each lecture. If you lose your voting card, you can make or print a new one ([PDF available here](#)); (<https://umd.instructure.com/courses/1307162/files/63644054?wrap=1>) there is also a [version available for your mobile device](#) (<https://umd.instructure.com/courses/1307162/files/63644055?wrap=1>). ([https://umd.instructure.com/courses/1307162/files/63644055/download?download\\_frd=1](https://umd.instructure.com/courses/1307162/files/63644055/download?download_frd=1)) This tool is meant to help me assess class mastery of learning goals, so it is important to be honest in your answers. You will not be judged on your voting card answers, nor should you judge anyone else! However, it is important to come prepared each lecture by doing the assigned reading and reviewing slides from the previous class.

There will also be group whiteboard work in lecture. Since all members of a group receive the same score for a given exercise, it is important to be engaged and cooperative with your group. It is also critical to insist on further discussion if you do not feel satisfied with a particular outcome during a group exercise—this is a learning environment, not a contest, and everyone should help each other! This semester, one of the students in your whiteboard group should upload the photo of the whiteboard using Google Jamboard (download the free app on the iOS or Android store. Here is the link for our [class Google Jamboard](#). <https://jamboard.google.com/d/1omIIRfy8cBkiZEhU4n-18FvS8FF31tQvGnQNWZ1IchY/viewer?f=0>). You should have access, but if it says you don't have permission, try requesting access from within the website or Jamboard app.

**Discussion Section** (Fridays, either at 1:00 pm or 2:00 pm depending on your section, in [ATL 2428](#) ([https://drive.google.com/open?id=1D4IlgSUX\\_4uFpGnBBh0O9a36Cv3vYusUO&usp=sharing](https://drive.google.com/open?id=1D4IlgSUX_4uFpGnBBh0O9a36Cv3vYusUO&usp=sharing))) serves a variety of roles. Primarily it provides an opportunity to think about and apply the course material. These periods are also a forum for question-and-answer sessions, problem-solving practice, and group discussions of issues brought up in the lectures. You are expected to attend discussion, and a portion of your grade will depend on your participation in these sessions. You will usually be given in-class work during discussion section due at the end of the class time. Graduate student Jongwon Park will be leading the discussion sections. There is a separate syllabus for discussion section.

**Lab Section** is centered around hands-on written and computer exercises demonstrating concepts relevant to various areas of astronomy, with a focus on proper scientific techniques and writing style. We will provide materials for the lab exercises; there is no required lab text. This semester we will be using Python; the lab TAs will introduce you to Python in Lab 0 (the first two lab meetings).

## Learning Goals

We hope you develop an appreciation for our place in the universe by taking this course. In addition, at the end of this course you should be able to....

- Convey the current state of knowledge regarding basic astronomy, our solar system, and extrasolar planets to a non-specialist.
- Solve complex problems requiring application of multiple astrophysical concepts.
- Collaborate with others to develop shared knowledge.
- Write scientifically and communicate your results effectively.
- Critically evaluate your own and your peers' written work.
- Interpret error, accuracy, and precision of astrophysical measurements both in the existing literature and for your own data.
- Use Python to analyze and visualize astrophysical data.

## Office Hours

You are strongly encouraged to attend the office hours of myself and the discussion and lab TAs; if these times don't work for you, we can try to accommodate other times (talk to us or email us).

## Engagement in the Class via Piazza

This term we will be using Piazza for learning from and helping teach your classmates. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza (except for personal matters, such as absences). If you have any problems regarding Piazza itself, email the developers at [team@piazza.com](mailto:team@piazza.com).

Sign up for our course at <https://piazza.com/umd/spring2022/astr121> <https://piazza.com/umd/spring2023/astr121> <https://piazza.com/umd/spring2023/astr121> or click on the UMD Piazza menu item to the left.

Some tips on using Piazza can be [found at this link](https://pages.cs.wisc.edu/~deppeler/cs400/pages/piazza_tips.html) ([https://pages.cs.wisc.edu/~deppeler/cs400/pages/piazza\\_tips.html](https://pages.cs.wisc.edu/~deppeler/cs400/pages/piazza_tips.html))

We encourage engagement in the class via Piazza. Part of your course grade will be based on use of Piazza to ask good questions and/or answer questions posted by other students.

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sically anything that isn't personal. Please estimation. You can be sure that any question ions - there is no better way to learn than

to try to explain a concept to someone else. I find that trying to explain something helps me realize what I need to understand better - I'm 100% sure this is the case for all of you too.

Please do NOT use Piazza for personal questions, for example about an absence or a grade; see the next section for what to do.

## Questions and Communicating with Instructors and TAs

As mentioned in the Piazza section, for most questions, including logistics, assignments, content of the course, and questions about astronomy, please use [Piazza \(https://umd.instructure.com/courses/1318846/external\\_tools/42711\)](https://umd.instructure.com/courses/1318846/external_tools/42711). Many other students will have these questions too! And ideally other students will know the answer and respond much quicker than will I.

For **personal issues** that are about you, such as absences, do not use Piazza. For these, [Canvas Inbox mail \(https://umd.instructure.com/conversations#filter=type=inbox\)](https://umd.instructure.com/conversations#filter=type=inbox) is best (click on Inbox on the far left and then compose a message to me). If for some reason you must use your own e-mail program, PLEASE be sure to start your Subject line with "ASTR121"; otherwise I may take longer or even fail to notice your e-mail.

## Course Notifications

This syllabus, the course schedule, homework assignments, and other course-related information can be accessed on ELMS/Canvas. IMPORTANT: class notifications will always be broadcast through Piazza; only rarely will we duplicate notifications via COURSEMAIL. So if you do not have access to Piazza or Canvas you must inform us as soon as possible. It is recommended that you check for notifications no less frequently than once per weekday. We will assume that you are receiving all messages, so check with us right away if you think you missed a notification.

## Reading Material

### Textbook

We will use the [OpenStax Astronomy textbook by Fraknoi, Morrison, and Wolff \(https://openstax.org/details/books/astronomy\)](https://openstax.org/details/books/astronomy). It is available for free on-line. Rather than rely on internet access (in fact, the publisher's website for another ASTR 120/121 textbook suddenly became inaccessible), be sure to download the pdf to whatever devices you will be using during the course. You can find the link on the textbook site, but here's a [direct link to the pdf download for convenience. \(https://assets.openstax.org/oscms-prodcms/media/documents/Astronomy-OP\\_zlft6LJ.pdf\)](https://assets.openstax.org/oscms-prodcms/media/documents/Astronomy-OP_zlft6LJ.pdf)

### Supplementary Reading

Professors Cole Miller and Derek Richardson have written [Supplementary Notes \(https://umd.instructure.com/courses/1318846/files/folder/supplements\)](https://umd.instructure.com/courses/1318846/files/folder/supplements) available in the files/Supplements folder. We will use these. Although some of the material is beyond the expectations for this course given the wide range of backgrounds of entering students meeting the prerequisites, these notes are extremely useful for anyone contemplating going on in astronomy or physics and related disciplines, and the sooner you master their content the better for you.

### Reading Assignments

Reading assignments for each lecture are listed in the last section of the Syllabus you are currently reading. As mentioned earlier, you are strongly encouraged to ask questions on Piazza about muddy concepts or items needing more explanation or depth.

## Grades and Exams

Overall grades will be determined by the final exam, two midterms, labs, homework assignments, discussion sections, in-class whiteboard activities, and Piazza/Class participation, with the following weighting:

Component	Weight
Midterm 1	10%
Midterm 2	10%
Final Exam	20%
Homework	15%

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Participation	5%
Labs	25%

Multiple graded items within each category above have the same weight (for example, if there are  $N$  whiteboard assignments (after dropping the lowest 1 score (which might be a missed assignment) as per the "rule" for whiteboards), each is worth  $1/N$  of your total whiteboard grade).

Compared to ASTR 120, there is now the lab, which counts for 25% of your grade. Accordingly, some of the other elements have been reduced in weight.

The following scale will be used to compute letter grades:

Grade	Range
A+	97% and above
A	93% to below 97%
A-	90% to below 93%
B+	87% to below 90%
B	83% to below 87%
B-	80% to below 83%
C+	77% to below 80%
C	73% to below 77%
C-	70% to below 73%
D+	67% to below 70%
D	63% to below 67%
D-	60% to below 63%
F	below 60%

For this course, letter grades correspond to the University's marking system, as follows:

- A+, A, A- denote excellent mastery of the subject and outstanding scholarship;
- B+, B, B- denote good mastery of the subject and good scholarship;
- C+, C, C- denote acceptable mastery of the subject;
- D+, D, D- denote borderline understanding of the subject, marginal performance, and it does not represent satisfactory progress toward a degree;
- F denotes failure to understand the subject and unsatisfactory performance.

There will be no curve on the final grades. There may need to be some adjustment to scores depending on the class average. However, any adjustment will be to lower the grade boundaries given above, never to raise them.

This class is too large to provide extra-credit opportunities for missed work, etc. Instead, your lowest homework score and lowest discussion score will not count toward your final grade.

Mid-semester grades will be based solely on work completed and graded by the time the grades are submitted.

## Midterms and Exam

There will be two midterm examinations, each given during class hours. Check the course schedule below for the dates. All midterms are held in the lecture room. These exams (and the final) are closed book with no notes, and you are required to bring a calculator. Each test will cover material presented in the reading and the lectures (excluding optional or bonus material clearly identified as such). The second midterm and the final are *cumulative*, so you are responsible for material covered by the earlier exam(s). If for whatever reason the University is officially closed on the exam date, the exam shifts to the next available date.

**Retest:** After each midterm you may take a copy of the exam questions with you and within one week may turn in new responses for any of the

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question 2 for regrading, or just question 3b, or with other students, but just like for standard than the regular exam, with limited



partial credit for answers (generally, the only available credit for a question will be 0%, 50%, or 100%; 100% requires your answers for the entire question to be correct and complete). If your score on a question is higher on the retest than on the actual midterm, the average of the two scores will be taken as the new score for that question. This gives you an opportunity to improve your exam score and reinforce the concepts being examined, hopefully resulting in even better understanding of the material (and a higher grade!). This is entirely optional, but you are strongly encouraged to consider doing the retests, at least for the tougher questions.

According to the University examination schedule, the final exam for this course will be held on Saturday May 13, from 8:00 am to 10:00 am, in our usual lecture room.

## Homework Assignments

Homework will be assigned most weeks and is to be turned in by 11:59 pm on the designated day (usually Tuesday). It is expected that each homework assignment will take a few hours to complete.

You are required to submit your homeworks in PDF format to the ELMS site. Ideally, you will use Word or LaTeX or other such programs, including for your equations. Equations are especially well-typeset in LaTeX, which is very useful to learn if you plan to have a career in astronomy, physics, math, etc. It is of course usually best to solve numerical problems on paper, and once you are done, write them in LaTeX or Word. However, we will allow handwritten submissions, provided the scan or photo used to produce the PDF must be well lit and in focus, and that the handwriting is clear. The grader will take off points for submissions that are hard to read, and if they cannot read or misread what you write due to poor quality handwriting or scan, you will lose points nonetheless.

To make it easier for our grader, the PDF file should be named "Lastname\_Firstname\_HWN.pdf". For example, if your name is Pat Smith and you are submitting homework 6, the PDF file you upload would be named Smith\_Pat\_HW6.pdf. Thanks for helping!

Late homeworks turned in less than 48 hours late will be penalized at least 20% (the penalty could be more, depending on how late you are). After 48 hours, no more homework will be accepted. Note that electronic submission means that you can turn in your assignment electronically at home, or even if you are sick. If you experience a valid emergency, you must write to me in Canvas or email **before the due date** telling me why you will be late. In this case, you must secure a valid written excuse and arrange with me to have the homework turned in as soon as possible and, in any event, absolutely no later than 48 hours after the due date because that is when we will distribute solutions.

You may work in groups to discuss problem-solving strategy, but **you must submit your own solution to each assignment**. To be particularly clear about this, everyone in a group must do their own, separate, non-duplicated write-up; for example, if you all collaborate on Google Docs for a homework, you are not allowed to all submit that same homework. Note that you must cite your source(s) on any essay-style questions, and this includes any websites you referenced. All websites are fair game, but you must indicate the URL of any website that you used. Always show all of your work, and include units (e.g., meters, seconds, light years) as appropriate! You may not copy solutions from the internet. **You also may not copy wording from our textbook!**

## Course Policies

By enrolling in this course you agree to abide by the campus [Course Related Policies \(http://www.ugst.umd.edu/courserelatedpolicies.html\)](http://www.ugst.umd.edu/courserelatedpolicies.html), which apply to this course. These include policies on student conduct, attendance, grades, and your rights. Specific considerations regarding some of these policies are below.

## Missed Exams, Assignments, or Classes

Any missed test, exam, or assignment (including both in class and out of class) must satisfy the requirements described in [Course Related Policies \(http://www.ugst.umd.edu/courserelatedpolicies.html\)](http://www.ugst.umd.edu/courserelatedpolicies.html).

The major scheduled grading events in this course are the two midterms and the final exam on the dates shown in the schedule below. Except in the case of emergencies, an excused absence from an exam must be requested in writing during the schedule adjustment period. A medically necessitated absence during an exam requires documentation from a medical professional. Any other emergency necessitating missing an exam requires a prompt written explanation. For an excused absence during an exam, a make-up exam will be given at a mutually agreed upon time. Make-up exams may be written or oral, at our discretion.

If you must miss a test or exam or assignment, or are unable to attend a lecture or discussion, and think you qualify for an excused absence, you must notify your instructor or TA **in advance as soon as you know about the absence**, as defined and detailed in [Course Related Policies \(http://www.ugst.umd.edu/courserelatedpolicies.html\)](http://www.ugst.umd.edu/courserelatedpolicies.html), or as soon as possible in extenuating circumstances.

When you are unable to attend a lecture or discussion, you must notify your instructor or TA in person during office hours.

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course.

will waive the assignment. A waiver means

that we determine your grade for the assignment group from all the assignments except the excused one; for example, if you have an excused absence and miss a graded in-class exercise, we'll determine your grade for the in-class assignment group from the fraction of the maximum number of points possible for the assignment group not counting the excused exercise. In other words, an excused absence from an in-class exercise counts neither for you nor against you.

For missed and late lab assignments, see the Lab Syllabus.

In all other cases, you'll have to rely on the "drop" policy for the relevant assignment group, in which (depending on the assignment group), your lowest 0, 1, or 2 scores are automatically dropped. For out of class work, such as homeworks, do the work early so that an unexpected illness or scheduled absence doesn't force you to use a drop.

## Use of Electronic Devices

You may use smartphones, tablets, and/or laptops in class (but NOT during midterms or the final exam) for taking notes or looking up something pertinent to the discussion. Otherwise you are expected to be focusing on the lecture or class work and not distracting your fellow students. All phones must be silenced. If you are expecting an urgent call, let one of us know before the lecture begins to minimize disruption. If use of an electronic device becomes disruptive (and this can include loud keyboard tapping!), you will be asked to be reseated or to leave the room altogether.

If you ask to leave the room during a midterm or exam, you must leave all electronic devices with the proctor.

## The Honor Code

Our campus has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studentconduct.umd.edu/> (<http://www.studentconduct.umd.edu/>).

To further exhibit your commitment to academic integrity, remember to sign the Honor Pledge on all examinations: "I pledge on my honor that I have not given or received any unauthorized assistance on this examination/assignment."

There are a couple of potential gray areas that arise naturally in this course. For homework and retests, you are permitted to work with other students in the class. In fact, you are encouraged to do so. This includes discussion of the problem and solution in a cooperative, mutually contributing fashion. However, you should work out and write out your answer in your own words. You should NOT, under any circumstances, simply copy someone else's homework and call that "working together." It is far better to ask for an extension than to copy someone else's homework! You should also NOT seek out or use "solution sets" from previous students. You may seek help on homework or retest problems from the tutors, TA, or myself.

If you have questions regarding what is appropriate and what is not, please talk to me.

## Masking Requirement

We follow [campus guidelines for safety and health](https://umd.edu/4Maryland/health-plan). (<https://umd.edu/4Maryland/health-plan>)

(<https://umd.edu/4Maryland/health-plan>)

## A Safe Learning Environment

The campus is meant to be a safe place to learn, free from harassment and intimidation of any kind. If you have experienced any form of harassment as a member of the university community, you should contact the [Office of Civil Rights & Sexual Misconduct](https://ocrsm.umd.edu/). (<https://ocrsm.umd.edu/>) on campus. Please be aware that faculty are required by law to report any instance of misconduct brought to their attention. For confidential assistance, contact [CARE](http://www.health.umd.edu/care) (<http://www.health.umd.edu/care>). The Department of Astronomy has web pages with [relevant links](http://www.astro.umd.edu/EDI/EDIResourcePage.html#Resources) (<http://www.astro.umd.edu/EDI/EDIResourcePage.html#Resources>). See also the Equity/Diversity tab on the [Department of Astronomy home page](http://www.astro.umd.edu). (<http://www.astro.umd.edu>)

We are happy to be informed of your preferred gender pronouns.

## Students with Special Needs

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us as soon as possible. Also be sure to [js](#) if you have not done so already. In [js](#) the necessary documentation to the

instructor no later than the lecture prior to the exam to ensure that the request can be met.

## Financial Aid

If you are experiencing difficulty paying for tuition or textbooks, consider contacting the [Office of Student Financial Aid \(http://www.financialaid.umd.edu\)](http://www.financialaid.umd.edu). We recognize that the cost of the textbook for this course can be a burden, but one thing to keep in mind is that at least you get to use it for 2 semesters! We do feel the textbook and accompanying online supplement are essential to achieving the learning goals of this course.

## Additional Help










If you are experiencing difficulties in keeping up with the academic demands of this course, you may wish to contact the campus [Learning Assistance Service \(http://www.counseling.umd.edu/LAS/\)](http://www.counseling.umd.edu/LAS/). Their academic coaches can help with time management, reading, math learning skills, note-taking, and exam preparation skills. All their services are free to UM students. For other counseling needs, try the campus [Counseling Center \(http://www.counseling.umd.edu/\)](http://www.counseling.umd.edu/) and the campus [Health Center. \(https://health.umd.edu/medical-behavioral-health\)](https://health.umd.edu/medical-behavioral-health)

## Copyright Notice

Class lectures and other materials, including anything distributed during discussion, are copyrighted and may not be reproduced for anything other than personal use without written permission from the instructor.

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## Course Summary:

Date	Details	Due
Thu Jan 26, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264660">Class 1: Overview (https://umd.instructure.com/courses/1337453/assignments/6264660)</a>	due by 11am
	 <a href="https://umd.instructure.com/courses/1337453/assignments/6310324">WB 01/26 (https://umd.instructure.com/courses/1337453/assignments/6310324)</a>	due by 11:59pm
Mon Jan 30, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6296678">Lab 0 - Error Activity (https://umd.instructure.com/courses/1337453/assignments/6296678)</a>	due by 4pm
	 <a href="https://umd.instructure.com/courses/1337453/assignments/6296658">Lab 0 - Writing Activity (https://umd.instructure.com/courses/1337453/assignments/6296658)</a>	due by 4pm
Tue Jan 31, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264665">Class 2: Properties of Stars (https://umd.instructure.com/courses/1337453/assignments/6264665)</a>	due by 11am
	 <a href="https://umd.instructure.com/courses/1337453/assignments/6316208">WB 01/31 (https://umd.instructure.com/courses/1337453/assignments/6316208)</a>	due by 11:59pm
Thu Feb 2, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264679">Class 3: Binary Stars and HR Diagrams (https://umd.instructure.com/courses/1337453/assignments/6264679)</a>	due by 11am
	 <a href="https://umd.instructure.com/courses/1337453/assignments/6318248">WB 02/02 (https://umd.instructure.com/courses/1337453/assignments/6318248)</a>	due by 11:59pm
Fri Feb 3, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287151">Discussion Section 1 (https://umd.instructure.com/courses/1337453/assignments/6287151)</a>	due by 8am



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**Leave Student View**

due by 2pm



Date	Details	Due
Tue Feb 7, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264710">Class 4: Star Clusters and Star Birth</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264710">https://umd.instructure.com/courses/1337453/assignments/6264710</a>	due by 11am
Wed Feb 8, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6321749">WB 02/07</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6321749">https://umd.instructure.com/courses/1337453/assignments/6321749</a>	due by 11:59pm
Wed Feb 8, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6298876">HW 1</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6298876">https://umd.instructure.com/courses/1337453/assignments/6298876</a>	due by 12pm
Thu Feb 9, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264711">Class 5: Evolution of Low Mass Stars</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264711">https://umd.instructure.com/courses/1337453/assignments/6264711</a>	due by 11am
Fri Feb 10, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6323660">WB 02/09</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6323660">https://umd.instructure.com/courses/1337453/assignments/6323660</a>	due by 11:59pm
Fri Feb 10, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287163">Discussion Section 2</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287163">https://umd.instructure.com/courses/1337453/assignments/6287163</a>	due by 8am
Mon Feb 13, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313562">Lab 1a - Intro to Python Part 1</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313562">https://umd.instructure.com/courses/1337453/assignments/6313562</a>	due by 11:59pm
Tue Feb 14, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264713">Class 6: Evolution of High-Mass Stars</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264713">https://umd.instructure.com/courses/1337453/assignments/6264713</a>	due by 11am
Thu Feb 16, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287223">P1</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287223">https://umd.instructure.com/courses/1337453/assignments/6287223</a>	due by 11:59pm
Thu Feb 16, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264716">Class 7: White Dwarfs, Neutron Stars, and Pulsars</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264716">https://umd.instructure.com/courses/1337453/assignments/6264716</a>	due by 11am
Fri Feb 17, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287162">Discussion Section 3</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287162">https://umd.instructure.com/courses/1337453/assignments/6287162</a>	due by 8am
Mon Feb 20, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313563">Lab 1b - Intro to Python Part 2</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313563">https://umd.instructure.com/courses/1337453/assignments/6313563</a>	due by 11:59pm
Mon Feb 20, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313539">Prelab 2</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313539">https://umd.instructure.com/courses/1337453/assignments/6313539</a>	due by 2pm
Tue Feb 21, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264719">Class 8: Special Relativity</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264719">https://umd.instructure.com/courses/1337453/assignments/6264719</a>	due by 11am
Wed Feb 22, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324320">HW2</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324320">https://umd.instructure.com/courses/1337453/assignments/6324320</a>	due by 12pm
Thu Feb 23, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264722">Class 9: General Relativity</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264722">https://umd.instructure.com/courses/1337453/assignments/6264722</a>	due by 11am

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due by 8am

Date	Details	Due
Mon Feb 27, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313553">Lab 2 - Peer Review Session Participation</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313553">https://umd.instructure.com/courses/1337453/assignments/6313553</a>	due by 4pm
Tue Feb 28, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264738">Class 10: Black Holes</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264738">https://umd.instructure.com/courses/1337453/assignments/6264738</a>	due by 11am
Thu Mar 2, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264741">Class 11: The Milky Way Galaxy</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264741">https://umd.instructure.com/courses/1337453/assignments/6264741</a>	due by 11am
Fri Mar 3, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287164">Discussion Section 5 - Review</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287164">https://umd.instructure.com/courses/1337453/assignments/6287164</a>	due by 8am
Mon Mar 6, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313564">Lab 2 - Stellar Parallax</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313564">https://umd.instructure.com/courses/1337453/assignments/6313564</a>	due by 11:59pm
Mon Mar 6, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313543">Prelab 3</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313543">https://umd.instructure.com/courses/1337453/assignments/6313543</a>	due by 2pm
Tue Mar 7, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6265240">Midterm 1</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6265240">https://umd.instructure.com/courses/1337453/assignments/6265240</a>	due by 11am
Tue Mar 7, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324736">P2</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324736">https://umd.instructure.com/courses/1337453/assignments/6324736</a>	due by 11:59pm
Thu Mar 9, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264930">Class 12: Galactic Recycling</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264930">https://umd.instructure.com/courses/1337453/assignments/6264930</a>	due by 11am
Fri Mar 10, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287160">Discussion Section 6</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287160">https://umd.instructure.com/courses/1337453/assignments/6287160</a>	due by 8am
Mon Mar 13, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313557">Lab 3 - Peer Review Session Participation</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313557">https://umd.instructure.com/courses/1337453/assignments/6313557</a>	due by 4pm
Tue Mar 14, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264933">Class 13: The Galactic Center</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264933">https://umd.instructure.com/courses/1337453/assignments/6264933</a>	due by 11am
Thu Mar 16, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264943">Class 14: Other Galaxies</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264943">https://umd.instructure.com/courses/1337453/assignments/6264943</a>	due by 11am
Fri Mar 17, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287159">Discussion Section 7</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287159">https://umd.instructure.com/courses/1337453/assignments/6287159</a>	due by 8am
Fri Mar 17, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313565">Lab 3 - Blackbodies and Stellar Spectra</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313565">https://umd.instructure.com/courses/1337453/assignments/6313565</a>	due by 11:59pm
Mon Mar 20, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313566">Prelab 4</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313566">https://umd.instructure.com/courses/1337453/assignments/6313566</a>	due by 2pm

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Date	Details	Due
Tue Mar 28, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264948">Class 15: The Cosmic Distance Ladder</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264948">https://umd.instructure.com/courses/1337453/assignments/6264948</a>	due by 11am
Wed Mar 29, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324739">P3</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324739">https://umd.instructure.com/courses/1337453/assignments/6324739</a>	due by 11:59pm
Thu Mar 30, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324327">HW3</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324327">https://umd.instructure.com/courses/1337453/assignments/6324327</a>	due by 12pm
Fri Mar 31, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264953">Class 16: Hubble's Law</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264953">https://umd.instructure.com/courses/1337453/assignments/6264953</a>	due by 11am
Mon Apr 3, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287158">Discussion Section 8</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287158">https://umd.instructure.com/courses/1337453/assignments/6287158</a>	due by 8am
Tue Apr 4, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313559">Lab 4 - Peer Review Session Participation</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313559">https://umd.instructure.com/courses/1337453/assignments/6313559</a>	due by 4pm
Thu Apr 6, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6264979">Class 17: Active Galaxies (Quasars etc)</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6264979">https://umd.instructure.com/courses/1337453/assignments/6264979</a>	due by 11am
Fri Apr 7, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6265151">Class 18: Galaxy Formation and First Galaxies</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6265151">https://umd.instructure.com/courses/1337453/assignments/6265151</a>	due by 11:59pm
Mon Apr 10, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287157">Discussion Section 9</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287157">https://umd.instructure.com/courses/1337453/assignments/6287157</a>	due by 8am
Tue Apr 11, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313566">Lab 4 - Cluster H-R Diagrams</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313566">https://umd.instructure.com/courses/1337453/assignments/6313566</a>	due by 11:59pm
Tue Apr 11, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6313548">Prelab 5</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6313548">https://umd.instructure.com/courses/1337453/assignments/6313548</a>	due by 2pm
Wed Apr 12, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6265155">Class 19: The Big Bang</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6265155">https://umd.instructure.com/courses/1337453/assignments/6265155</a>	due by 11am
Thu Apr 13, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324731">HW4</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324731">https://umd.instructure.com/courses/1337453/assignments/6324731</a>	due by 12pm
Fri Apr 14, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6265154">Class 20: The Big Bang, continued</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6265154">https://umd.instructure.com/courses/1337453/assignments/6265154</a>	due by 11am
Fri Apr 14, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324740">P4</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324740">https://umd.instructure.com/courses/1337453/assignments/6324740</a>	due by 11:59pm
Fri Apr 14, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6287156">Discussion Section 10</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6287156">https://umd.instructure.com/courses/1337453/assignments/6287156</a>	due by 8am
 <b>You are currently logged into Student View</b>	<i>Resetting the test student will clear all history for this student, allowing you to view the course as a brand new student.</i>	due by 4pm

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Date	Details	Due
	<a href="#">/assignments/6313560</a>	
Tue Apr 18, 2023	 <b>Class 21: Evidence for the Big Bang</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6265156">https://umd.instructure.com/courses/1337453/assignments/6265156</a>	due by 11am
Thu Apr 20, 2023	 <b>Class 22: Cosmic Inflation</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6265168">https://umd.instructure.com/courses/1337453/assignments/6265168</a>	due by 11am
Fri Apr 21, 2023	 <b>Discussion Section 11 - Review</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6287155">https://umd.instructure.com/courses/1337453/assignments/6287155</a>	due by 8am
	 <b>Lab 5 - Rotation Curve of the Milky Way</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6313567">https://umd.instructure.com/courses/1337453/assignments/6313567</a>	due by 11:59pm
Mon Apr 24, 2023	 <b>Prelab 6</b> ( <a href="https://umd.instructure.com/courses/1337453/assignments/6313551">https://umd.instructure.com/courses/1337453/assignments/6313551</a> )	due by 2pm
Tue Apr 25, 2023	 <b>Midterm 2</b> ( <a href="https://umd.instructure.com/courses/1337453/assignments/6265242">https://umd.instructure.com/courses/1337453/assignments/6265242</a> )	due by 11am
Thu Apr 27, 2023	 <b>Class 23: The Case for Dark Matter</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6265187">https://umd.instructure.com/courses/1337453/assignments/6265187</a>	due by 11am
	 <b>P5</b> ( <a href="https://umd.instructure.com/courses/1337453/assignments/6324741">https://umd.instructure.com/courses/1337453/assignments/6324741</a> )	due by 11:59pm
Fri Apr 28, 2023	 <b>Discussion Section 12</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6287154">https://umd.instructure.com/courses/1337453/assignments/6287154</a>	due by 8am
Mon May 1, 2023	 <b>Lab 6 - Peer Review Session Participation</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6313561">https://umd.instructure.com/courses/1337453/assignments/6313561</a>	due by 4pm
Tue May 2, 2023	 <b>Class 24: Structure Formation</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6265188">https://umd.instructure.com/courses/1337453/assignments/6265188</a>	due by 11am
Thu May 4, 2023	 <b>Class 25: Dark Energy and the Fate of the Universe</b> ( <a href="https://umd.instructure.com/courses/1337453/assignments/6265183">https://umd.instructure.com/courses/1337453/assignments/6265183</a> )	due by 11am
Fri May 5, 2023	 <b>Discussion Section 13 - Review</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6287153">https://umd.instructure.com/courses/1337453/assignments/6287153</a>	due by 8am
	 <b>Lab 6 - Hubble's Law</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6313568">https://umd.instructure.com/courses/1337453/assignments/6313568</a>	due by 11:59pm
Tue May 9, 2023	 <b>Class 26: Life in the Universe</b> <a href="https://umd.instructure.com/courses/1337453/assignments/6265191">https://umd.instructure.com/courses/1337453/assignments/6265191</a>	due by 11am
		due by 12pm

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Date	Details	Due
Thu May 11, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6265192">Class 27: Life in the Universe, continued</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6265192">https://umd.instructure.com/courses/1337453/assignments/6265192</a>	due by 11am
	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324742">P6</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324742">https://umd.instructure.com/courses/1337453/assignments/6324742</a>	due by 11:59pm
Sat May 13, 2023	 <a href="https://umd.instructure.com/courses/1337453/assignments/6265244">Final Exam</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6265244">https://umd.instructure.com/courses/1337453/assignments/6265244</a>	due by 8am
	 <a href="https://umd.instructure.com/courses/1337453/assignments/6324743">Bonus</a> <a href="https://umd.instructure.com/courses/1337453/assignments/6324743">https://umd.instructure.com/courses/1337453/assignments/6324743</a>	due by 11:59pm

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