

ASTR 1010 Syllabus

Astronomy of the Solar System

Dr. Cassandra Hall

University of Georgia, Spring 2022

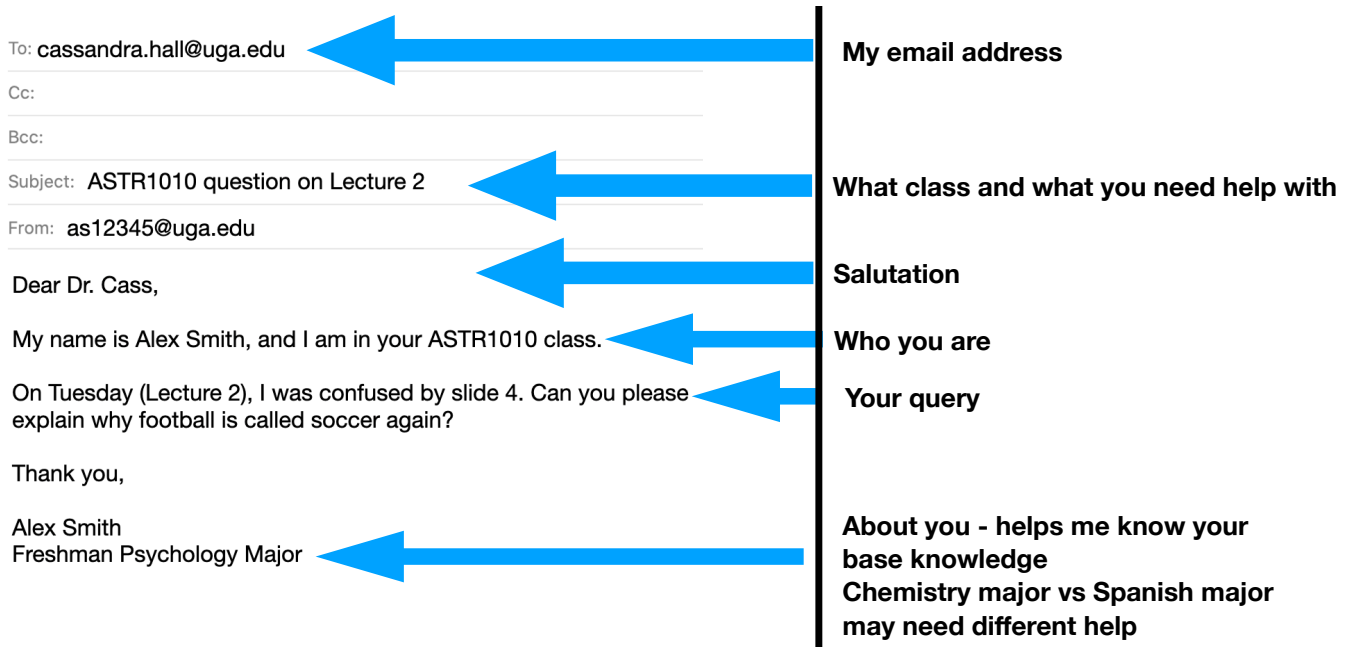
Syllabus last updated: Wed 05 Jan 2022

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Instructor Information

- Dr. Cassandra Hall
Assistant Professor of Computational Astrophysics
Department of Physics & Astronomy and Center for Simulational Physics
University of Georgia
- **Most students call me Dr. Cass.** You can call me Cass, Dr. Cass, Dr. Hall or Professor Hall - whatever you feel comfortable with. Please do not call me Mrs/Ms/Miss Hall, these are not prefixes I use.

- Email: cassandra.hall@uga.edu
- Here is an example email. If you need to contact me, follow this format so I can help you as quickly as possible.



Class Information

- Class is on Tuesday and Thursday: 1110 - 1225 in Forestry Resources 2 (Building number 1140), Room 100. (Correct for Spring 2022, check elsewhere if you are reading this in a different semester.). Here is a map with building numbers <https://www.architects.uga.edu/sites/default/files/documents/field/maps/current/24x36campusmapnumbers.pdf>
- **I and UGA strongly encourage you to wear a mask.**
- Office Hours via Zoom: 0930-1030 Tuesdays and 1400-1500 Thursday (email me for link).

Prerequisites

You do not need to have taken any other UGA courses. Astronomy is a quantitative science. Some middle-school level mathematics such as rearranging equations for a variable, scientific notation, and basic trigonometry are used. Logarithms are also used, (high school mathematics). All mathematics is used infrequently, and is largely descriptive. You can use the following resources.

- **Rearranging equations:** <https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/solving-for-a-variable>
- **Scientific notation:** <https://www.khanacademy.org/math/in-in-class-7th-math-cbse/x939d838e80cf9307:exponents-and-powers/x939d838e80cf9307:large-numbers-in-standard-form/v/scientific-notation-old>

- **Basic trigonometry:**
 - <https://www.khanacademy.org/math/trigonometry/trigonometry-right-triangles#trig-solve-for-a-side>
 - <https://www.khanacademy.org/math/trigonometry/trigonometry-right-triangles#trig-solve-for-an-angle>
- **Logarithms:** <https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:logs/x2ec2f6f830c9fb89:log-intro/v/logarithms>

Astronomy is a physical science. It is very important that you understand we will discuss elements of **mathematics, physics, and chemistry** in this course, and you will need to understand some challenging concepts such as conservation of mass and energy. **Astronomy is essentially physics in space, and this course contains some challenging elements.**

Group work

Everyone will be assigned a group. You will find a pdf document on the ELC (picture below) - use it to find your group, and email its members. Group work counts for 10% of your grade. Extra credit is earned for a particularly creative, high effort, or funny recap.

The screenshot shows the eLearning Commons interface for the course ASTR1010 Astronomy of the Solar System. The sidebar on the left contains navigation links: Overview, Bookmarks, Course Schedule, Table of Contents (109), Syllabus (checked), Group numbers (1), Lecture materials, Homework (8), August, Le (36), and Chapter quizzes (64). The main content area is titled 'Group numbers' and contains the following text: 'In this pdf you can find which group number you have been randomly assigned to. Contact your group members and get to know each other. I suggest: Everyone share their favourite colour. Everyone tell their favourite space-based fact. Everyone share their favourite animal. Cat memes welcome.' Below this text is a 'Download' button and a progress bar showing '0 % 0 of 1 topics complete'. A large blue arrow points to the 'Group numbers' link in the sidebar, and another large blue arrow points to the 'Download' button.

The group work is a recap of a lecture. On Tuesday of each week, 2 groups will present a short recap.

Your options are:

- Live, in class recap using the whiteboard.
- Pre-recorded recap (video + sound)

- Tik-tok style recap
- Song
- Poem
- Dance (?)

Be creative in your recap - there's extra credit (2.5%) up for grabs! If you don't like standing up in front of people, I recommend pre-recording your recap.

Rules and grading:

- Recap must be 5 minutes or under. There is a 1% penalty for every 30 seconds you go over or under. For example, a 5 minute 1 second recap receives no penalty. A 5 minute 31 second recap receives a 1% penalty. A 6 minute 1 second recap receives a 2% penalty, etc.
- **If the recap is not live, the deadline for receiving the recap is 12 noon on the Monday before you present.** All lates are awarded zero (0%).
- Every group member must participate in the recap. Those who do not participate are awarded a 0%. The rest of the group's grade is unaffected. Participation can be making the diagrams, writing the script, editing the video, etc - some active, positive contribution.
- The group will verify who participated. Covering for a friend who did not participate, by lying to me and saying they did, is a direct violation of the UGA honesty code, and the entire group will be awarded a 0% grade if such a violation occurs.

Grading

The group project is worth 10% of your grade.

- 0% if the recap is late
- 5% if the recap is a minimum effort, e.g., just reading notes out loud, or contains multiple mistakes made by not reading the lecture notes properly.
- 10% if the recap has good diagrams, clear explanations, and is concise.
- Up to 2.5% extra credit can be earned by doing something particularly high-effort, creative, or funny! Humour makes things memorable, so make it as engaging as possible.

Dr. Cass' guide to doing well in this (and any!) course at UGA

For any college-level course, you should study a minimum of 3 hours per 1 hour of class per week. For ASTR1010, that means studying 7.5 hours a week in addition to the mandatory, assessed homeworks.

Focus on understanding concepts and how to do things. In this course, **I will ask you to apply the knowledge you gain in class to questions/problems you have never seen before.** Don't panic! You have all the information you need to do that when it happens.

Ask questions.

Engage in class - answer questions, discuss with your group, etc. If you are participating virtually because of COVID, you can still ask questions.

Study technique for this course

About 75% of this class tends to be Freshman, and about 90% of the class is a non-science major. **In general, to succeed in a STEM subject at college, you must do as many practice questions as possible.** Reading the slides and textbook alone is not enough, since this is

generally passive. **You need to test and challenge your conceptual understanding to actively learn.**

Effectively studying for science, engineering and mathematics based courses may be different to what you are use to. In subjects such as English, reading assigned texts may form the bulk of a successful study guide (I do not know for sure, don't quote me!).

1. Read through the lecture slides (20% of your study time)
2. Read through the textbook (20% of your study time)
- 3. Practice questions (60% of your study time)**

The screenshot shows a course navigation menu on the left with items: Syllabus (1), Group numbers (1), Lecture materials (35), Homeworks (15), August 12 - January 3, Refreshers (3), Homework 1 (6), Homework 2 (6), Learn by doing quizzes (36), and Chapter quizzes (64). The 'Homeworks' section is highlighted. To the right, a 'Maths refresher 2' section is shown with a start date of Aug 12, 2021 2:00 PM. Below it, a 'Homework 1' section is shown with a start date of Aug 12, 2021 2:00 PM. A blue arrow points from the 'Practice for homework 1' link to the 'Homework 1' section.



ASTR1010 Astronomy of the Solar System Fa...



Cassandra Hall

Course Home Content Classlist Grades Tools

Search Topics

Overview

Bookmarks

Course Schedule

Table of Contents

Zoom

Syllabus

Group numbers

Lecture materials

Homeworks

August 12 - January 3

Learn by doing quizzes

Chapter quizzes

CHAPTER 1.
THINKING LIKE AN
ASTRONOMER

Chapter quizzes

Print

Each of these quizzes is designed to cement your understanding of concepts in each chapter. You have unlimited attempts, so keep going until you score 100%!

It is best to read the accompanying chapter before attempting them.

Download

Expand All | Collapse All

1.54 % 1 of 65 topics complete

CHAPTER 1. THINKING LIKE AN ASTRONOMER

CH 01 FLASHCARDS

Link

CH 01 TEST YOUR UNDERSTANDING QUIZ

Quiz

CHAPTER 2. PATTERNS IN THE SKY--MOTIONS OF THE EARTH AND THE MOON

Course Objectives

- 1) Provide a basic knowledge of our Solar System. To do this, we need to put our Solar System into context, so we will also learn about other Solar Systems, and where we fit in on a galactic scale.
- 2) Understand the basics of the four fundamental forces of nature (gravity, electromagnetism, strong nuclear and weak nuclear force).
- 3) Learn to think like a scientist.

AT THE END OF THE COURSE, YOU WILL BE ABLE TO EXPLAIN THE FOLLOWING:

1. Distance scales - where the Earth fits compared to all the structure in the Universe.
2. The impact that the Earth's motion has on where the stars, the solar system planets and the Sun appear in the sky, and why we have seasons.
3. What the force of gravity does, how it acts, and Newton's and Kepler's laws.
4. How light from objects in the Universe such as stars and galaxies can tell us what objects are made up of and how they move.
5. How telescopes work, the different kinds, and the main parts of telescope.
6. How stars and planets form.
7. How the solar system planets are all different, but have some similarities.
8. What the atmospheric composition is of all the solar system planets, how they are different, and why they are different.
9. Why the Sun shines, and why it will not shine forever.
10. How we know the interior structure of the Earth.
11. What tectonic plates are, and how this is related to the magnetic field of the Earth.
12. How we search for planets around other stars.
13. What the planets around other stars are like.
14. Whether or not you think we are alone in the Universe, based on material in this course.

Course materials

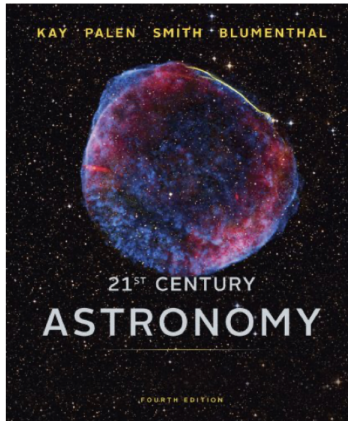
- Scientific calculator (must have square root function, powers, logs, etc)

- Course textbook:**

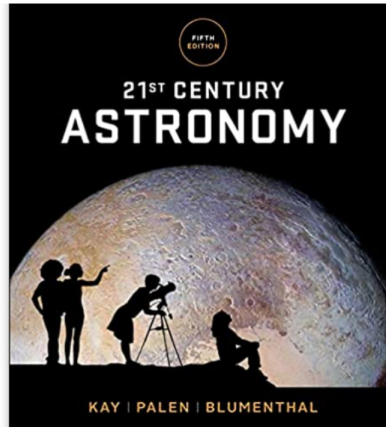
- 21st Century Astronomy: The Solar System, 4th edition [Kay, Palen, Smith, Blumenthal, 2013, ISBN 10: 0393918785 /ISBN 13: 9780393918786].

•Available used from places such as abebooks.com for around \$5-\$20. **You are welcome to use e-text versions of the 4th, 5th or 6th editions that exist on the internet.** You are also welcome to use 5th and 6th print editions. I have not chosen to use these since they are much more expensive. You can use them if you want, they cover the same material, but the page numbers will not match to what we use.

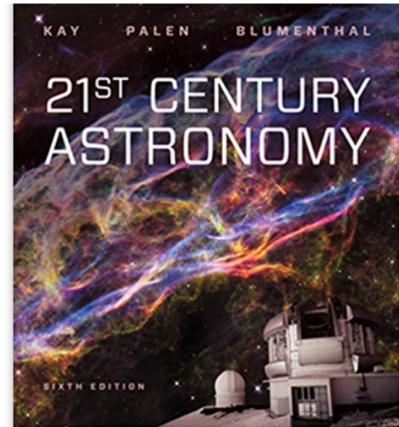
4th Ed. (I use)



5th Ed. (Fine)



6th Ed. (Fine)



Assessment

Assessment for the spring 2022 term is through 9 homeworks. Homework 0 and homework 1 are each worth 2.5%. Homeworks 2,3,4,5,6,7,8 are 5% each). 1 group project (10%), 1 midterm (25%), and 1 final (25%).

- Homework 0 and 1 are worth 2.5%. The rest are worth 5%.
 - **You can work in groups of up to 5 people, and pick your own groups.**
 - If you do not have a group I will assign you to one.
 - Homeworks are open note, and you can use the internet. Please note the internet is frequently wrong about astronomy, so you should use your notes instead. You cannot use cheating websites such as Chegg. Any instance of Chegg or similar is automatic fail and reported to honesty office.
 - You cannot work in larger groups, copying without working it out yourself is not allowed, and collaboration outside of your group is also not permitted. Any of this is a violation of UGA's academic honesty policy, and is reported to the honesty office.
 - Each homework is done through the eLC <https://uga.view.usg.edu/d2l/login>
- The group project is worth 10%, and everyone must participate as discussed in the group project section of this syllabus.
- The midterm is worth 25%. You can bring 5 pages (so 10 sides) of printed notes. No electronic devices are allowed, and is an automatic fail if you are caught with one during the exam. Turn it off and leave it in your bag.

- The final is worth 25%. You can bring 5 pages (so 10 sides) of printed notes. No electronic devices are allowed, and is an automatic fail if you are caught with one during the exam. Turn it off and leave it in your bag.

You can pull your grade up using extra credit as follows:

- Attendance: up to 10%
- Creative/funny group recap: 2.5%
- Complete mid-semester evaluation form: 1%
- Final course evaluation form: 1%

These are the only extra credit opportunities available.

- Each homework is completed through the eLC <https://uga.view.usg.edu/d2l/login> . You can start the homework and come back to it later. There is no time limit.
- Homeworks are open note, but you must not work together.
- Each homework focuses on the preceding 3-4 lectures, but can (and does) ask you about anything covered in the course so far.

Grade scale

- A is for a score of 90.00 or above,
- A- is for the range 87.00 – 89.99,
- B+ is for 84.00 – 86.99,
- B is for 80.00 – 83.99,
- B- is for 77.00 – 79.99,
- C+ is for 74.00 – 76.99,
- C is for 70.00 – 73.99,
- C- is for 60.00 – 69.99,
- D is for 50.00 – 59.99,
- and F is for any average below 50.00.

Late policy and extensions

Fairness and honesty are very important to me. Extensions are generally not granted. Late work receives a zero. Extensions are granted if there is *documented evidence of a genuine reason beyond your control as to why you are late*. This is to be fair to everyone else who did get work in on time. Examples of accepted evidence included a doctor's sick note, a police report, a positive COVID test e.t.c. Fabricating a reason for requesting an extension is very bad form, is often found out (we do follow up on evidence!) and a direct violation of UGA's academic honesty policy. All instances are reported to UGA's academic honesty office, and you only get one warning before it leaves a permanent mark on your transcript. So, please don't do this.

If you have a genuine reason for requesting an extension, I will of course work with you and do my best to help you, I care very deeply about your success in my class and am happy to try and work out alternative arrangements where possible.

Extra credit

The following is the only extra credit available. There are no make-up opportunities to pull up poor grades at the start of the course, because this is unfair to students who have consistently worked hard. Keep this in mind!

- 2% extra credit is available through completion of course surveys.
 - There will be one survey *during* the course to ask how the course can be improved. This will be done during class, and you will receive an extra 1% on your final grade for completing the survey.
 - There will be one course evaluation after the course (but before the final exam). You will receive an extra 1% on your final grade for completing the survey.
- 2.5% extra credit is available for a particularly high-effort, creative group project.
- Attendance extra credit is earned at random for attending class. 10% total is available (a whole letter grade). I use a random number generator in advance to determine which days credit will be awarded. **If you are sick, do not come to class.** You can attend remotely through zoom and still get the credit if it is awarded. However, your camera must be on, and you must be in front of it to receive credit for attendance.

Attendance policy

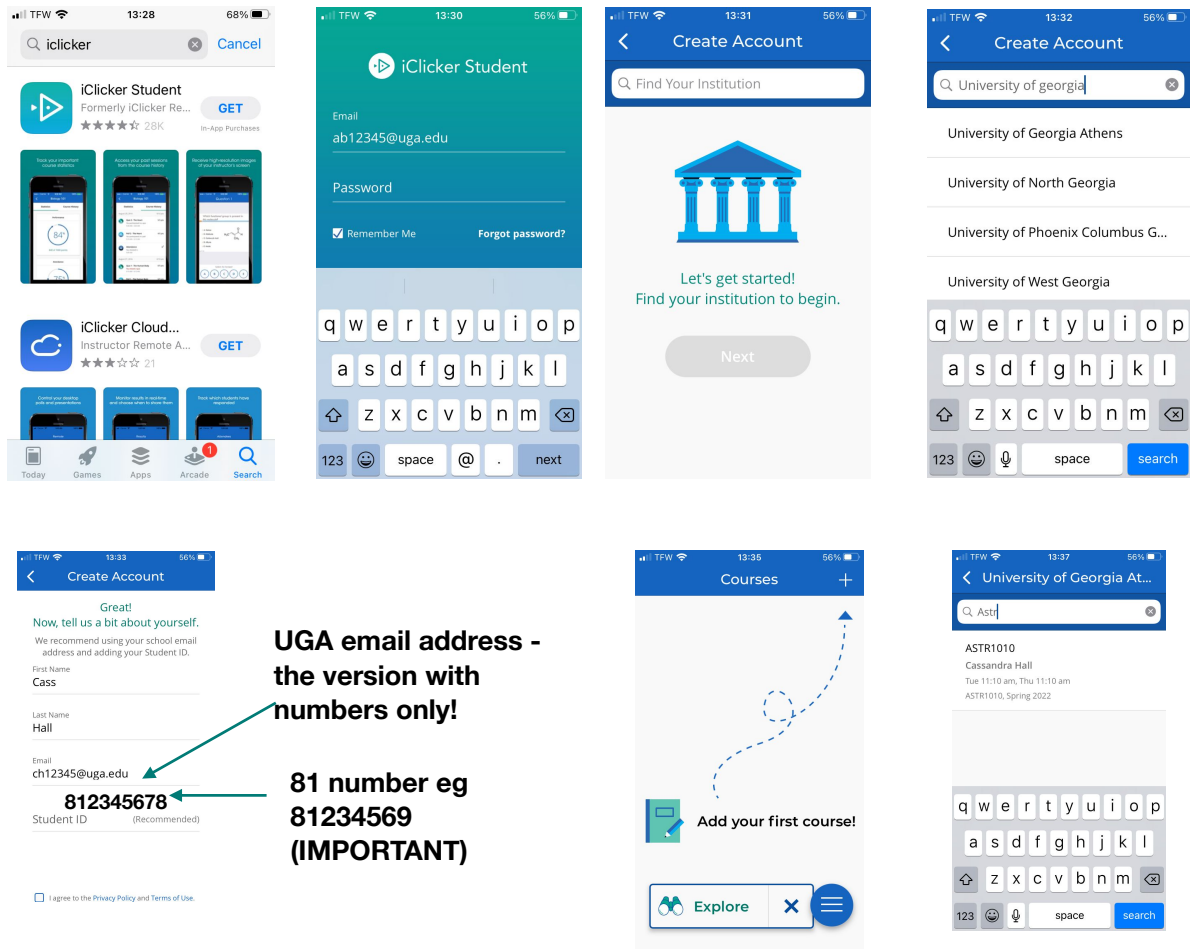
None, it does not form part of your grade. This is due to the ongoing pandemic, so no student is penalised for not being in a classroom if they don't feel comfortable.

However, **extra credit for attendance is earned randomly throughout the course.** I use a random number generator in advance to determine which days credit will be awarded, but it is frequent, so come to class!

Please do not email me to excuse absences - contact the class grader who manages the extra credit for attendance. You must have documentation such as a doctors note, positive covid test, or police report.

To register for attendance, download the iClicker app (free!) and register for ASTR1010. Use the diagram below. You must use your uga email (eg, ab12345@uga.edu, *not* the "friendly" version - not adam.begood@uga.edu *and* use the correct 81 number from the back of your UGA card. You need both of these entered correctly, or you will not get the extra credit.

When you get to class, sign in using the app. You can only do this if you are physically in class - it checks that you are present. You can sign in between 11AM and 11:20 am. You cannot sign in any earlier or later, so if you are more than 10 minutes late, you will be marked as absent. **You must allow iClicker to use your location while you are using the app.**



Lecture materials

All materials are uploaded to the ELC. This includes powerpoint presentations, pdf slides (with notes), and lecture recordings from my laptop screen and microphone.

Additional resources

The ELC contains over 100 extra resources for ASTR1010. They are broken into “Chapter quizzes” and “Learn by doing”, and you will find them in the “content” part of the course. These are intended for self-directed study - please use them regularly and pick topics that are relevant or that you are struggling with.

As you will note from the syllabus, each lecture we focus on one chapter. It is good practice at the end of the lecture to go through the chapter quizzes and see if you are able to answer the questions.

The ELC will tell you what you got wrong, and you can keep going until you get them all right.

If appropriate, there will be additional maths practice for each homework as well. These will be called “Practice homeworks”, and will be short. For practice of conceptual questions for each assessed homework, please refer to “Chapter quizzes” and pick the relevant chapters for the homework.

COVID-19

I will be wearing a mask. I strongly encourage you to also wear a mask. The class will be moved online if people become sick, and wearing a mask is a good way to prolong or avoid this. I strongly encourage you to get vaccinated. I am fully vaccinated. CDC guidance states that everyone in areas of high transmission, such as schools, should wear masks regardless of vaccination status <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>

I don't feel well, should I come to class?

Under no circumstances should you come to campus if you are sick, even if you feel OK. I will make alternative arrangements for you to attend virtually if you are well enough.

How can I obtain the COVID-19 vaccine?

University Health Center is scheduling appointments for students through the UHC Patient Portal (https://patientportal.uhs.uga.edu/login_dualauthentication.aspx). Learn more here – <https://www.uhs.uga.edu/healthtopics/covid-vaccine>.

The Georgia Department of Health, pharmacy chains and local providers also offer the COVID-19 vaccine at no cost to you. To find a COVID-19 vaccination location near you, please go to: <https://georgia.gov/covid-vaccine>.

In addition, the University System of Georgia has made COVID-19 vaccines available at 15 campuses statewide and you can locate one here: <https://www.usg.edu/vaccination>

What do I do if I have COVID-19 symptoms?

Students showing COVID-19 symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see, <https://www.uhs.uga.edu/info/emergencies>.

What do I do if I test positive for COVID-19?

If you test positive for COVID-19 at any time, you are required to report it through the DawgCheck Test Reporting Survey. We encourage you to stay at home if you become ill or until you have excluded COVID-19 as the cause of your symptoms. UGA adheres to current Georgia Department of Public Health (DPH) quarantine and isolation guidance and requires that it be followed. Follow the instructions provided to you when you report your positive test result in DawgCheck.

Equality, diversity and inclusivity statement

Everyone has the right to an inclusive, collegial, and encouraging work and study environment regardless of their race, sex, social status, gender identity, sexual orientation, age, religion or disability status. Any instances of discrimination, bullying or sexual harassment will be treated in

the strongest possible terms, including seeking prosecution where appropriate. Please let me know your preferred pronouns. If you tell me and I get it wrong, call me out on it. Mine are she/her.

Science is supposed to be objective. In an ideal world, it would be. However, most of scientific history has been written by the voice of the privileged. For centuries, women were barred from higher education institutes. Black people were denied education at all. LGBT+ people faced persecution and would lose their job if their orientation became known. Indigenous Americans were forcibly removed from their land. As such, much of scientific history is white washed, straight washed, and mostly written by men. Therefore, both covert and overt biases may exist, despite the intended scientific objectivity of course material. I encourage students to let me know how either my behaviour or this course may be improved in light of this information. We all have a responsibility to be better, and to do better.

Land acknowledgement

I acknowledge that we are on the traditional territory and homelands of the following Indigenous American peoples:

- Tsalaguwetiyi (Cherokee, East)
- S'atsoyaha (Yuchi)
- Mvskoke (Muscogee / Creek)

This land was not given freely. It remains unceded. I acknowledge that lives, languages, traditions, religions and history were lost through acts of coercion and genocide by settlers. I stand in solidarity with protectors of the land, and those who advocate for access to healthcare, land rights, and education for indigenous Americans.

Course schedule (*NB subject to change during course*)

The course schedule will be altered if at any point the instructor deems it beneficial to your learning. Note that lecture slides contain information that is not present in the textbook, and you will be examined on both *textbook and lecture content*.

Items with a question mark(?) are approximate dates or have not been finalised yet. **All topics subject to change**, attend or watch the lecture to be sure of the material.

Date	Lecture	Chapter	Topic	HW?
Tue 11 Jan 2022	1	Ch. 1	Why learn astronomy? Intro to distance.	HW0 available. Due 20 Jan 2022
Thu 13 Jan 2022	2	Ch. 2	The motion of the Earth	
Tue 18 Jan 2022	3	Ch. 2	The motion of the Earth	HW1 available. Due 25 Jan 2021
Thu 20 Jan 2022	4	Ch. 3	The motion of astrophysical objects	HW0 due.
Tue 25 Jan 2022	5	Ch. 3	The motion of astrophysical objects	HW1 due.
Thu 27 Jan 2022	6	Ch. 4	Gravity and astrophysical orbits	

Tue 01 Feb 2022	7	Ch. 4	Gravity and astrophysical orbits	HW2 available. Due 08 Feb 2022.
Thu 03 Feb 2022	8	Ch. 5	The electromagnetic spectrum	
Tue 08 Feb 2022	9	Ch. 5	The electromagnetic spectrum	HW2 due.
Thu 10 Feb 2022	10	Ch. 6	Astronomical tools	
Tue 15 Feb 2022	11	Ch. 6	Astronomical tools	HW3 available. Due 22 Feb 2022.
Thu 17 Feb 2022	12	Ch. 7	Formation of planet systems	
Tue 22 Feb 2022	13	Ch. 7	Formation of planet systems	HW3 due.
Thu 24 Feb 2022	14	Ch. 8	Terrestrial planets and the moon	
Tue 01 Mar 2022	15	Ch. 8	Terrestrial planets and the moon	HW4 available. Due 15 Mar 2022.
Thu 03 Mar 2022			Midterm exam	
Tue 08 Mar 2022			Spring break	
Thu 10 Mar 2022			Spring break	
Tue 15 Mar 2022	16	Ch. 9	Terrestrial planets atmosphere	HW4 due.
Thu 17 Mar 2022	17	Ch. 9	Terrestrial planets atmosphere	
Tue 22 Mar 2022	18	Ch. 10	Giant planets	
Thu 24 Mar 2022	19	Ch. 10	Giant planets	HW5 available. Due 31 Mar 2022
Tue 29 Mar 2022	20	Ch. 11	Moons and rings	
Thu 31 Mar 2022	21	Ch. 11	Moons and rings	HW5 due.
Tue 05 Apr 2022	22	Ch. 12	Dwarf planets	
Thu 07 Apr 2022	23	Ch. 12	Dwarf planets	HW6 available. Due 14 Apr 2022
Tue 12 Apr 2022	24	Ch. 14	Our star	
Thu 14 Apr 2022	25	Ch. 14	Our star	HW6 due.
Tue 19 Apr 2022	26	NA	Exoplanets and their detection	
Thu 21 Apr 2022	27	NA	Exoplanets and their detection	HW7 available. Due 28 Apr 2022
Tue 26 Apr 2022	28	Ch. 24	Life in the universe	
Thu 28 Apr 2022	29	Ch 24	Life in the universe	HW7 due.
Tue 03 May 2022	30	NA	Is anyone out there?	HW8 available. Due 10 May 2022
Thu 05 May 2022			NO CLASS	

Tue 10 May 2022			FINAL IN-CLASS EXAM. Open note. No electronic devices. No digital notes. Paper notes/ textbook only.	HW8 due.
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