ASTR 1010 Syllabus
Astronomy of the Solar System
Dr. Cassandra Hall

University of Georgia, Autumn 2021

Syllabus last updated: Monday 16 August 2021

Instructor Information

- Dr. Cassandra Hall
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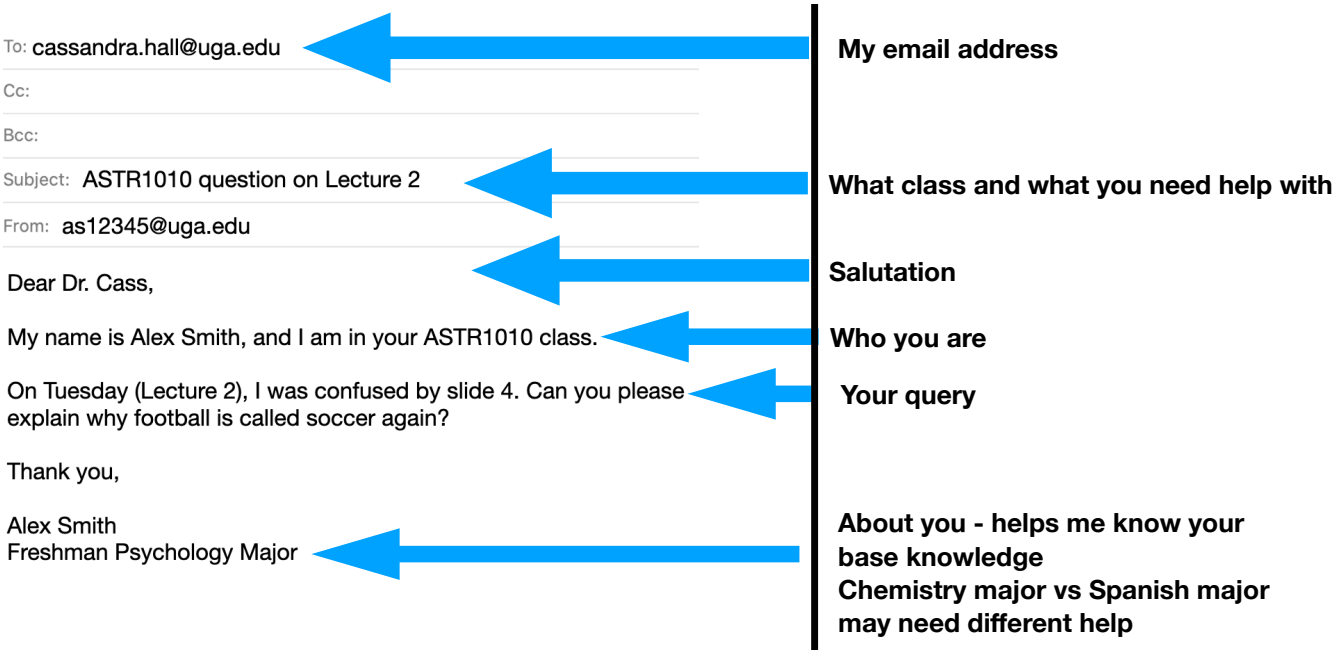
  University of Georgia

- **You can call me Cass, Dr. Cass, Dr. Hall or Professor Hall** - whatever you feel comfortable with. Please don't call me Mrs/Ms/Miss Hall, these are not prefixes I use. Most students call me Dr. Cass.



- 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 room 102 in the Miller Learning Center. 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

None, but astronomy is a quantitative science. **Some middle/high-school level mathematics such as rearranging equations, scientific notation, basic trigonometry, and logarithms is essential** to describe certain phenomena.

Mathematics-based questions make up around 5% of your grade. You can still comfortably get an A if you miss every math question.

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.

Group work

Everyone has been assigned to a group through a random number generator. You will find a pdf document on the ELC (picture below) - use it to find your group, and email its members. **Each session will begin with a 5 minute recap of the previous session, lead by a randomly selected group.** The next group is chosen at the end of the lesson. **The same group can be picked multiple times,** so it is important that you try and think about how to explain what you are learning to your peers.

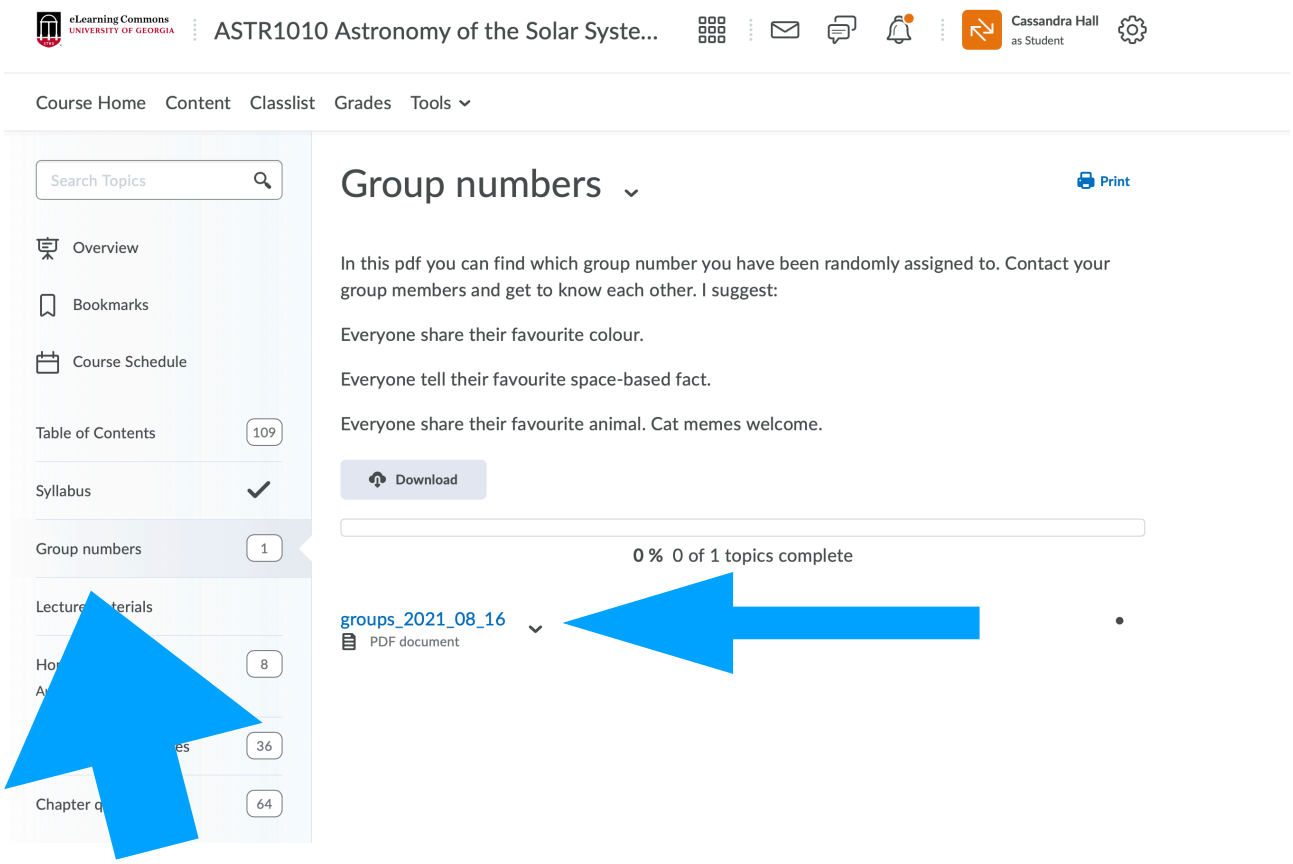
Your options are:

- Live, in class recap

- Pre-recorded recap (video + sound)
- Tik-tok style recap
- Song
- Poem
- Dance (?)

Be creative in your recap! If you don't like standing up in front of people, I recommend pre-recording your recap.This work is not graded.

The best group at the end of the semester will receive a certificate along with some cool exoplanets posters.



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.

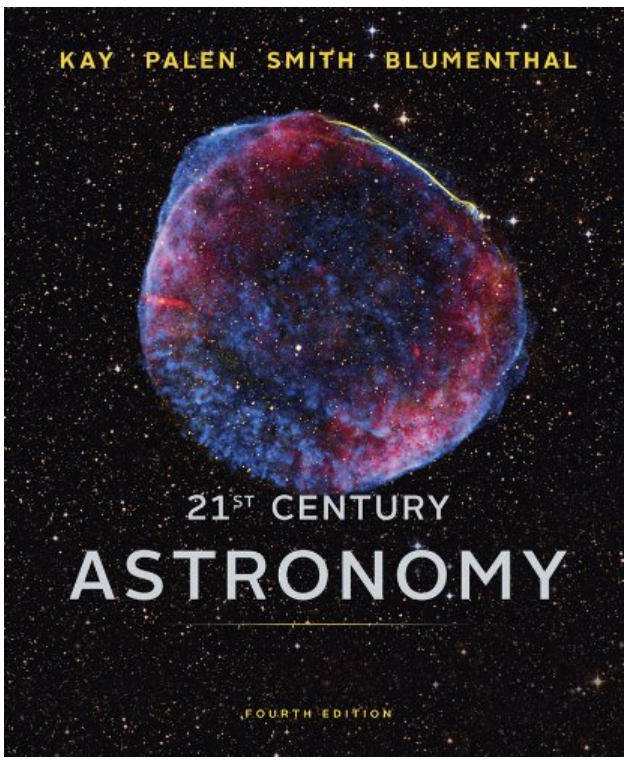
Engage in class - answer questions, discuss with your group, etc. If you are participating virtually because of COVID, you can still ask questions.

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

•Textbook isn't mandatory, but you will have a much harder time without it.

•**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.

Assessment

Assessment for the autumn 2021 term is through eight homeworks, and one final exam. COLLABORATION IS NOT ALLOWED. The course has a zero tolerance policy where every incident is reported. This is because these homeworks must be an assessment of your own ability. You can work together on practice homeworks. If you require alternative arrangements for a test, please let me know as soon as possible because the disability service sometimes does not let me know in time.

• Final exam is worth 10%. You can bring your notes and/or textbook, but **no electronic devices and no communicating with classmates.**

•**For the final exam, if your notes are on your laptop/tablet/phone, you will not be allowed to use them.** They must be printed or handwritten. Prepare them in advance.

• Each homework is worth 11.25% (8 HW in total).

• 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

Extensions are generally not granted. Late work receives a zero. Extensions are only 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.

Extra credit

3% extra credit is available through completion of course surveys.

• There will be two surveys *during* the course to ask how the course can be improved. These will be done during class, and ***you will receive an extra 1% on your final grade for completing each survey (so 2% for midterm surveys)***.

•***These surveys will be anonymous. They will be collected through an online service, and collated by someone in the Center for Teaching and Learning.***

•There will also be a final course survey at the end of term. ***You get an extra 1% on your final grade for completing this.***

•Please note that even if you do very well on this course, you still cannot get more than 100%. (i.e., the extra 3% cannot take you to 103%). If you would have got more than 100% and feel hard done by, please talk to me. I am always looking for students who want to do more work!

Attendance policy

None.

Lecture materials

Lectures are recorded and uploaded to the ELC. Usually the same day, but sometimes these fail repeatedly if site traffic is high. This is beyond my control.

Slides (in keynote and powerpoint) and notes (in .pdf) are also uploaded to the ELC on the same day as the lecture.

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 strongly encourage you to wear a mask. I will be wearing a mask. I strongly encourage you to get vaccinated. I am fully vaccinated. CDC guidance states that everyone in schools should wear masks regardless of vaccination status cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.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*)

Note that lecture slides contain information that is not present in the textbook, and you will be examined on both *textbook and lecture content.*

In general, each homework *focuses* on the preceding lectures since the last homework. For example, HW2 covers lecture 4, 5, 6 and 7 (Chapters 3 and 4), but can ask you anything from lectures 1 to 7.

HW3 *focuses* on lecture 8, 9, 10 and 11 (Chapters 5 and 6), but can ask you anything from lectures 1-11.

All assessed homework is open note, no time limit, and must be your own work entirely (i.e. absolutely no collaboration allowed). **Each homework counts for 11.25% of your final grade.**

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?
Thu 19 Aug 2021	1	Ch.1	Why learn astronomy? Intro to distance.	
Tue 24 Aug 2021	2	Ch. 2	The motion of the Earth	
Thu 26 Aug 2021	3	Ch. 2	The motion of the Earth	HW1 available. Due 02 Sep 2021
Tue 31 Aug 2021	4	Ch. 3	The motion of astrophysical objects	
Thu 02 Sep 2021	5	Ch. 3	The motion of astrophysical objects	
Tue 07 Sep 2021	6	Ch. 4	Gravity and astrophysical orbits	
Thu 09 Sep 2021	7	Ch. 4	Gravity and astrophysical orbits	HW2 available. Due 16 Sep 2021

Tue 14 Sep 2021	8	Ch. 5	The electromagnetic spectrum	This lesson will either have a sub professor, be recorded, have an alternative activity etc due to Cass attending a mandatory day-long meeting. Not yet finalised.
Thu 16 Sep 2021	9	Ch. 5	The electromagnetic spectrum	Midterm class survey 1?
Tue 21 Sep 2021	10	Ch. 6	Astronomical tools	
Thu 23 Sep 2021	11	Ch. 6	Astronomical tools	HW3 available. Due 05 Oct 2021
Tue 28 Sep 2021	12	Ch. 7	Formation of planet systems	
Tue 05 Oct 2021	13	Ch. 7	Formation of planet systems	
Thu 07 Oct 2021	14	Ch. 8	Terrestrial planets and the moon	
Tue 12 Oct 2021	15	Ch. 8	Terrestrial planets and the moon	HW4 available. Due 19 Oct 2021
Thu 14 Oct 2021	16	Ch. 9	Terrestrial planets atmosphere	
Tue 19 Oct 2021	17	Ch. 9	Terrestrial planets atmosphere	
Thu 21 Oct 2021	18	Ch. 10	Giant planets	Midterm class survey 2?
Thu 26 Oct 2021	19	Ch. 10	Giant planets	HW5 available. Due 04 Nov 2021
Tue 02 Nov 2021	20	Ch. 11	Moons and rings	
Thu 04 Nov 2021	21	Ch. 11	Moons and rings	
Tue 09 Nov 2021	22	Ch. 12	Dwarf planets	HW6 available. Due 16 Nov 2021
Thu 11 Nov 2021	24	Ch. 14	Our star	
Tue 16 Nov 2021	25	Ch. 14	Our star	
Thu 18 Nov 2021	26	NA	Exoplanets and their detection	
Tue 23 Nov 2021	27	NA	Exoplanets and their detection	HW7 available. Due 30 Nov 2021
Thu 25 Nov 2021			**Thanksgiving break - no class**	
Tue 30 Nov 2021	28	Ch. 24	Life in the universe	
Thu 02 Dec 2021	29	Ch. 24	Life in the universe	Final class survey? HW8 available. Also covers lecture 30. Due 14 Dec 2021.

Tue 07 Dec 2021	30	NA	Is anyone out there?	
Thu 09 Dec 2021			**FINAL IN-CLASS EXAM.** Open note. No electronic devices. No digital notes. Paper notes/ textbook only.	