Astronomy 112

Fall 2021

In-person and synchronous on-line sections

Assignments Grading scale Course schedule Policies University help and links

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Semester important dates

August 23 Classes begin
August 30 Last day to add classes
September 7 Last day to drop classes without penalty
September14 Last day to drop (50% tuition penalty)
September 15 – October 27 Unrestricted withdrawal period (100% tuition penalty)
See GMU Fall 2021 Calendar for complete schedule at https://registrar.gmu.edu/calendars/fall_2021/

Course Description

This is the laboratory that goes along with the introductory course Astronomy 111. The purpose of this course is to help students understand the process of science through astronomy investigations and the use of realistic simulations. An important learning goal is to help students understand and practice the rudiments of scientific reasoning as a model for investigations in other disciplines.

Blackboard Login Instructions

Access to My Mason and GMU email are required to participate successfully in this course. Please make sure to update your computer and prepare yourself to begin using the online format BEFORE the first day of class. Check the IT Support Center website. Navigate to the Student Support page for help and information about Blackboard. In the menu bar to the left you will find all the tools you need to become familiar with for this course. Take time to learn each. Make sure you run a system check a few days before class. Become familiar with the attributes of Blackboard and online learning.

Required Textbooks

There are no required textbooks for this course. All materials will be found in the course on Blackboard. If you are currently enrolled in Astronomy l11 the assigned textbook will be useful for background information. In addition the course has a link to the text, ***Astronomy***, a free, open education resource from OpenStax.

Course Learning Outcomes

Course Learning Outcomes

1. Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding:
    a. evolves based on new evidence
    b. differs from personal and cultural beliefs
2. Recognize the scope and limits of science.
3. Recognize and articulate the relationship between natural science and society and the application of science to societal challenges
4. Evaluate scientific information (e.g., distinguish primary and secondary sources; assess credibility and validity of information).

5. Participate in scientific inquiry and communicate the elements of the process, including:
    a. Making careful and systematic observations
    b. Developing and testing a hypothesis
    c. Analyzing evidence
    d. Interpreting results

Technology Requirements

Hardware: You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and access to a fast and reliable broadband internet connection (e.g., cable, DSL). A larger screen is recommended for better visibility of course material. You will need speakers or headphones to hear recorded content and a headset with a microphone is recommended for the best experience. For the amount of Hard Disk Space required taking a distance education course, consider and allow for:

the storage amount needed to install any additional software and
space to store work that you will do for the course.
If you consider the purchase of a new computer, please go to Patriot Tech to see recommendations.

Software: You will need a browser and operating system that are listed compatible or certified with the Blackboard version available on the the myMason Portal. See supported browsers and operating systems. Log in to myMason to access this course. Labs may use Acrobat Reader, Flash, Java, and Windows Media Player, QuickTime and/or Real Media Player.. Your computer should be capable of running current versions of those applications. Also, make sure your computer is protected from viruses, see some possibilities here: Mason IT suggested anitvirus software

Students owning Macs or Linux should be aware that some courses may use software that only runs on Windows. You can set up a Mac computer with Boot Camp or virtualization software so Windows will also run on it. Watch this video about using Windows on a Mac. Computers running Linux can also be configured with virtualization software or configured to dual boot with Windows.

Note: If you are using an employer-provided computer or corporate office for class attendance, please verify with your systems administrators that you will be able to install the necessary applications and that system or corporate firewalls do not block access to any sites or media types.

Course-specific Hardware/Software

Check the syllabus for your course or contact the instructor prior to the start of the course to find out about specific technical requirements for your class. Hardware or software required for your course or program may be available for purchase at Patriot Computers (the University's computer store that offers educational discounts and special deals).

Course Schedule - ***Pre-lab assignments are due at midnight the day before your section meets. Group assignments are due at the end of the scheduled class period. Specific lab topics may change during the semester.***

Assignments week of	Lab Topic (subject to change)	Overview
August 23	**Introduction to the lab – syllabus and schedule overview – Mandatory**	Orientation to lab procedures and introductory activity
August 30	**1A-Virtual observatory lab group work (50 points)**	Group lab to learn how images are created from filters. Second half of the lab is an individual virtual tour of the GMU observatory.
Dates will vary – sign up for tour in advance	**1B – Observatory tour (50 points)**	Tours on selected dates, sign up for selected date and time. Report due one week after tour is completed
September 6	**Labor Day – no labs this week – no sections meet**	**Labor Day holiday – no labs this week**
September 13	**2-Solar system walk (quiz 10 points, group lab report 90 points)**	Understand size and scale of solar system and its place in the universe. Practice with building formulas and using a spreadsheet.
September 20	**3-Navigating the sky (quiz 10 points, group lab report 90 points) Stellarium for distance courses, Farquhar globes for in-person**	Orienting earth in space. Practice with coordinate systems.
September 27	**4-The Moon (quiz 10 points, group lab report 90 points)**	Practice analyzing evidence, graphing data, and making connections from fundamental measurements

Assignments week of	Lab Topic (subject to change)	Overview
October 4	**5-Planetary motion (quiz 10 points, group lab report 9 points)**	Focus on Kepler's laws and motion of objects around the Sun
October 11	**Fall break Monday – no labs this week -no sections meet**	**Monday holiday – no labs this week**
October 18	**6-Measuring the planets (quiz 10 points, group lab report 90 points)**	How we can know the mass, radius, and density of planets
October 25	**7-Planetary Atmospheres (quiz 10 points, group lab report 90 points)**	Exploring the theory of how the solar system came to be and looking at supporting data
November 1	**8- Reflectance Spectroscopy (quiz 10 points, group lab report 90 points)**	Investigation of reflectance as a means of identifying key components of planet chemistry
November 8	**9- Solar system formation (quiz 10 points, group lab report 90 points)**	Searching for geological features, similar to those on earth, to understand similarities and differences of the two planets.
November 15	**10-Exploring Mars and Mars geology (quiz 10 points, group lab report 90 points)**	Examining previous and upcoming science missions and how they use data from orbiters to develop a proposal for a mission to answer a science question
November 22	**Thanksgiving — no astronomy sections meet this week**	**Thanksgiving holiday – No labs this week**
November 29	**Make-up lab -Near-Earth objects (quiz 10 points, individual lab report 90 points)**	Evidence based reasoning to develop and refine hypotheses
December 6	***No final exams for Astronomy 112 labs***	

Assignments

1. **Pre-lab assignments (Individual 10 points each)**: The pre-lab assignments must be completed at midnight of the day before your section meets. These are open book and notes, but must be your own work.
2. **Group assignments in class (90 points** each): You will work in small groups during the scheduled class time to explore the lab topic, gather data to use in an investigation of the concept and answer questions based on what you have found. These are completed in class and submitted before then end of the class each week.
3. **Observatory out of class lab (50 points in class, 50 points observatory tour)**: This lab is unique in that it is a combination of an in-class group activity and an individual tour that you will sign up for on a date and time that you can attend. A report on the tour is due one week after you attend your selected tour. More information and sign up for the tours will be available during the first weeks of class.

Course Policies: You are expected to attend each of the scheduled sessions. If some emergency arises (illness, etc.), you must contact the instructor in advance if possible. You have one "Free Ticket", an individual make-up lab the week after the Thanksgiving break.

Instructor-Student Communication: Your instructor will respond to your emails as quickly as possible. Before sending an email, please check the following (available on your Blackboard course menu) unless the email is of a personal nature:

1. Syllabus
2. Ask the Professor
3. On-demand Blackboard videos on how to use Blackboard features, and Technical Requirements.

Feel free to respond to other students in the Ask the Professor forum if you know the answer.

Technology. You will need a reliable computer and internet access to view course materials in Blackboard. You may also need to download programs such as Stellarium or Excel to complete lab assignments.

In case of difficulties for synchronous labs: If our synchronous meetings are interrupted by technical problems, for example I lose connectivity, or there is a power outage, please continue working with your group if we have reached that stage. Otherwise stand-by for at least 15 minutes while I try to reconnect, etc. If the session can't be restarted I will contact you by email or announcement to let you know the work-around.

If the problem is on your end try to rejoin the session. If nothing works you will need to wait for the video of the session and will complete the group lab work as an individual assignment. I will record the introductory material for you to watch if this happens. Sometimes just exiting and re-entering is sufficient. You may also need to try joining the session by phone, or with a different browser.

Grading Scale

Your grade is based on the points from 10 lab exercises . Each lab is worth up to 100 points, with a possible maximum 1000 points. Your grade is assigned as shown below.

Points	Letter grade
930 - 1000	A
900 -929	A-
870 - 899	B+
830 -86	B
800 -829	B-
750 -799	C+
700 -749	C
670 -699	C-
600 -669	D
Below 60	F

University Policies and Resources

a. Academic Honesty: You are expected to be familiar with and abide by the University's Honor Code. The Code can be found here. It is your responsibility to see me if you have questions about these policies. George Mason University has an honor code that states the following:

> *To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the University Community have set forth this:*

b. Students must follow the university policy for Responsible Use of Computing.
c. Student services: The University provides range of services to help you succeed academically and you should make use of these if you think they could benefit you. I also invite you to speak to me (the earlier the better).
d. Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
e. The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance. Counseling Center: Student Union I, Room 364, 703-993-2380.
f. Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester. All academic accommodations must be arranged through that office. Please note that accommodations MUST BE MADE BEFORE assignments or exams are due. I cannot adjust your grade after the fact.
g. Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.
h. The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. University Writing Center: Robinson Hall Room A114, 703-993-1200. The writing center includes assistance for students for whom English is a second language.
i. Diversity: George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.