ASTR 112 202
Fall 2022 (CRN 70282)

Section: 202
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Classroom: Planetary Hall room 112
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Office hours: MW 3pm-4pm

GENERAL INFORMATON: Section 202 will be taught in-person in Planetary Hall room 112. Masks are optional. The labs are group activities, with 3 students in each group. Students are required to bring their own personal laptop computers to class each week. If you feel sick, you must complete the lab activity remotely in order to protect the health of the other students.

- Labs are taught in person in Planetary Hall room 112
- Labs groups are composed of 3 students each
- Each student should bring their own personal laptop computer to the lab
- Masks are optional while in the classroom
- Students experiencing COVID-19 symptoms may complete lab activities remotely via Zoom

EDUCATIONAL GOALS: The general education natural sciences courses are designed to engage students in scientific exploration; foster their curiosity; enhance their enthusiasm for science; and enable them to apply scientific knowledge and reasoning to personal, professional, and public decision-making. Astronomy 112 contributes to this goal within the content of stellar and galactic astronomy. The goals of the lab class include helping students to:

- Understand how scientific inquiry is based on investigation of objective evidence
- Appreciate the nature of scientific knowledge and understanding
- Recognize the scope and limits of science
- Understand the relationship between natural science and society
- Evaluate scientific information
- Participate in scientific inquiry and communication

OBJECTIVES: The laboratory course ASTR 112 is the companion to the lecture course ASTR 111: The Solar System. It is designed to reinforce the concepts presented in the lecture course through hands-on experimentation and realistic computer simulations. These tools and techniques are intended to help students better understand what astronomers have learned about the universe, and the observational techniques they use to gather astronomical information. The lab activities will also help students develop skills in graphing, scientific reasoning, and critical thinking that may transfer to other areas of study and interest.

SUPPLIES: You will need the following supplies:

- Personal laptop computer
- Access to Blackboard outside of class
- Notebook for keeping track of class activities and completed labs
- Hardcopies of lab background and instructional materials

- Scientific calculator

Pre-lab preparation materials, lab report templates, pre-lab quizzes, and additional supplementary materials will be delivered via Blackboard. You should read the pre-lab materials before each week's class. **You are required to complete each pre-lab quiz before the beginning of each week's lab activity.** Be sure to check Blackboard for updates and announcements each week before coming to class.

BLACKBOARD LOGIN INSTRUCTIONS: Access to My Mason and GMU email are required to participate 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, and navigate to the Student Support page for help and information about Blackboard. In the menu bar on the left, you will find all the tools you need to become familiar with this course. 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 is no required textbook for this course. All materials can be found in the course page on Blackboard. If you are currently enrolled in Astronomy 111, the assigned textbook for that course will be useful for providing some additional background information for each lab. Another useful resource is the open-access on-line text, *Astronomy*, which is a free educational resource available on OpenStax.

LAB PROCEDURES: Much of the time you spend in lab will be working in 3-person groups. Be sure that you have contact information for your lab partners and that you come to class each week prepared to carry out the complete lab. Lab reports are due at the end of each class period and will usually be graded the following week. Pre-labs quizzes are individual assignments and must be completed without consulting other students. **Lab reports submitted each week by the groups must list all student members so that all students get credit for the lab.**

NOTE: In order to receive credit for a lab, each student must be registered in the appropriate Blackboard group at the time of submission.

It is advisable to keep a lab notebook with copies of completed labs. This may be on paper or electronic. Either way, your lab notebook will be a valuable resource at the end of the semester when you work to identify an unknown object using the tools and techniques learned earlier in the semester. It is important therefore that you attend every lab session and keep accurate records of your work.

GRADING

The laboratory activities will help you to understand how astronomers gather information about celestial objects and analyze it to learn about their properties. The material is designed to complement the concepts in planetary astronomy presented in the associated lecture course. You will use simulated optical and radio telescopes along with simulated photometers and spectrometers to help you understand and analyze what you see. **Each student must complete and submit 10 Lab Reports, and 10 pre-lab quizzes (including one for the Observatory Visit). There is also a mandatory Observatory Visit.**

Lab Reports: There are 10 In-Class Labs scheduled during the semester, plus one Makeup Lab at the end of the semester.

Observatory Visit: A virtual visit to the Mason Observatory, including submission of an Observatory Visit Report. This is an individual activity.

Pre-Lab Quizzes: Pre-lab background preparation material is provided for each lab. Read this material and then take the pre-lab quiz, which is due before each weekly lab meeting. There are 10 Pre-Lab Quizzes.

Makeup Lab: Pan additional lab will be available at the end of the semester in case students missed one of the earlier labs, or if they wish to replace a previous low-scoring lab in order to improve their final semester grade.

Final Semester Grade: Grades for the semester will be determined as follows:

Graded Elements	**Possible points**
Lab Reports – 10 regular in-class labs, each worth 100 points. A missed lab counts 0 points. You must attend class in order to receive credit for lab participation.	1000
Pre-Lab Quizzes – 10 quizzes are required, each worth 10 points (one quiz for each of the 10 labs).	100
Virtual Observatory Visit – Virtual visit to the Mason Observatory, including submission of an Observatory Visit Report.	100
Total	**1200**
11th Lab – A makeup lab that students can use to replace a lab missed due to exceptional circumstances, or for those who wish to replace the lowest-scoring lab of the 10 regular labs.	100 Replaces a missed lab or low-scoring lab

Letter Grade	**Percent Score**
A+	97-100
A	93-96.9
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	75-79.9
C	70-74.9
C-	67-69.9
D	60-66.9
F	below 60

Each lab missed will lower your grade by approximately one letter grade. Missing 4 labs or more will result in automatic failure. Labs cannot be made up except under exceptional circumstances. No work will be accepted after the last regular class meeting. There are no extra credit assignments, so the final course grade depends solely on work done during the regular semester.

LABORATORY CONDUCT

Cell Phones: Inappropriate (not class-related) use of personal or lab electronic devices may result in the student being sent asked to leave the lab classroom.

Personal computers: Personal computers are required in order to carry out the lab assignments.

Classroom courtesy: Use the lab time to work on astronomy. Students who disrupt the classroom with loud, inappropriate, or off-topic conversations may be asked to leave the lab after a warning. Please show courtesy to your fellow students and to your instructor by giving whole-hearted attention to the topic at hand.

Health and safety: Due to the COVID-19 pandemic, all students may wear masks while in the classroom. Students feeling unwell or uncertain about their COVID-19 status may complete lab activities remotely via Zoom.

Food and drink: Food and drink are NOT permitted in the classroom.

Visitors: You may not bring visitors to the astronomy lab with you, even if they are students enrolled in other sections of the course. You must attend the section in which you are enrolled in order to get credit for the class.

GENERAL POLICIES

Withdrawal: If you need to withdraw from this course you must do it within the University established time frame. Check Patriot web for important dates.

Students with Disabilities: Please contact the Office of Disability Services (SUB I, Room 222, Phone 703-993-2474, http://ods.gmu.edu/), if you have a learning or physical disability that will need accommodation in the astronomy laboratory. Give the appropriate paperwork to as soon as possible so the proper accommodations can be provided for you.

Honor Code: Student members of the George Mason University community pledge not to **cheat**, **plagiarize**, **steal**, and/or **lie** in matters related to academic work. For more information and definitions of the terms above go to http://oai.gmu.edu/honor-code. Group work is important in the lab, and part of doing this work honestly is doing your part and giving teammates credit for their contributions. **Lab reports should always list all of the members so that all team members get credit for the lab.**

Safety and security: The provost's office has set up a system for notifying students and staff of emergencies. You can sign up for emergency messages to your cell phone by going to https://alert.gmu.edu. Call 911 in case of life-threatening emergencies in the classroom.

GMU email account: Students must activate their GMU email accounts to receive important University information, including messages related to this class. Course information will usually be conveyed through Blackboard. Please use the Blackboard email function as your primary means of communicating with the instructor in this class.

Other useful campus resources:

Writing Center: A114 Robinson Hall; (703) 993-1200; http://writingcenter.gmu.edu
University Library: "Ask a Librarian" http://library.gmu.edu/mudge/IM/IMRef.html
Counseling and Psychological Services (CAPS): (703) 993-2380; http://caps.gmu.edu
University Policies: The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty and staff conduct in university affairs.

Important Dates for Fall 2022

First day of classes; last day to submit Domicile Reclassification Application; Payment Due Date; full semester waitlists removed	Aug 22
Last day to add classes—all individualized section forms due. Last day to drop with no tuition penalty	Aug 29
Last day to drop with 100% tuition refund	Sept 6
Final day to drop with 50% tuition refund	Sept 13
Selective withdrawal period	Sept 28-Oct 24
Fall Break	Oct 10
Thanksgiving Recess	Nov 23-Nov 27
Incomplete work from Spring 2022 due to Instructor	Oct 21
Last day of classes	Dec 3

Schedule of Labs and Quizzes

This is the lab schedule for Section 202. Each section will cover the same material during the designated week. Pre-lab exercises and quizzes are always due on Blackboard before your scheduled lab meeting begins.

Date	Schedule of Labs and Quizzes
Individual Choice of Sessions	**GMU Observatory Visit** – must be completed during one of the sessions designated for your section. Take the pre-lab quiz before visiting the observatory.
22 August	**Introduction to ASTR 112**
	You must attend the first lab meeting on 8/22 or risk being dropped
29 August	**LAB 1: Virtual Telescope** – *pre-lab quiz due by 4:30PM*
5 September	**Labor Day Recess – NO CLASS**
12 September	**LAB 2: Solar System Walk** – *pre-lab quiz due by 4:30PM*
19 September	**LAB 3: Navigating the Sky** – *pre-lab quiz due by 4:30PM*
26 September	**LAB 4: Gravity and Newton's Laws** – *pre-lab quiz due by 4:30PM*
3 October	**LAB 5: The Moon** – *pre-lab quiz due by 4:30PM*
10 October	**Fall Break Recess – NO CLASS**
17 October	**LAB 6: Properties of Light** – *pre-lab quiz due by 4:30PM*
24 October	**LAB 7: Reflectance Spectroscopy** – *pre-lab quiz due by 4:30PM*
31 October	**LAB 8: Moons of Jupiter** – *pre-lab quiz due by 4:30PM*
7 November	**LAB 9: Planetary Atmospheres** – *pre-lab quiz due by 4:30PM*
14 November	**LAB 10: Solar System Formation** – *pre-lab quiz due by 4:30PM*
21 November	**Thanksgiving Day Recess – NO CLASS**
28 November	**LAB 11: Makeup Lab – Exoplanets** – *pre-lab quiz due by 4:30PM*
	There is no Final Exam in ASTR 112