ASTR 111 - Introductory Astronomy: The Solar System - Credits: 3
Monday & Wednesday 10:30-14:30.
Tentative Syllabus: Version May 28, 2020

Catalog Description: Introduction to Astronomy: The Solar System. Topics include history of astronomy, evolution of the solar system, properties of planets, scientific method, critical thinking, nature of light, and principles of telescope design.

Notes:
1) Fulfills general education requirement in natural science (lab).
2) ASTR 111 and 112 can be used to fulfill a 4-credit lab science requirement, not for physics majors.

Instructor and Contact Information:
Lecturer: Erdal Yiğit, Associate Professor of Physics
Office: Planetary Hall 261
Email eyigit@gmu.edu
Office Hours: Tuesday 12-13:00

Introduction: This is an introduction to the science of astronomy. The course begins with the historical development of astronomy and our understanding of the night sky, then covers the structure and content of the solar system, and then telescopic and space exploration used to study the solar system and extra-solar planets. Emphasis will be on developing a big picture view of the solar system as a context for the place of Earth in the cosmos.

Purpose: Astronomy 111 is part of the general education program at GMU. According to the GMU catalogue the purpose of general education courses is:

"…to educate, liberate, and broaden the mind, and to instill a lifelong love of learning. In conjunction with each student's major program of study and other electives, minors, or certificates, this program seeks to produce graduates with intellectual vision, creative abilities, and moral sensibility as well as skills to ensure a well-rounded and usable education."

GMU General Education courses will thus ensure that all undergraduates develop skills in information gathering, written and oral communication, and analytical and quantitative reasoning; expose students to the development of knowledge by emphasizing major domains of thought and methods of inquiry; enable students to attain a breadth of knowledge that supports their specializations and contributes to their education in personal and professional ways; and encourage students to make important connections across boundaries—for example, among disciplines, between the university and the external world, and between the United States and other countries."

Astronomy 111 is a general education natural science course, designed to help students understand the scientific process and to develop their scientific reasoning skills in the context of astronomy. Astronomy 111 has for its subject matter the nature of light and the nature of the solar system (and extrasolar planets). The main emphasis of the course is investigating how astronomers have come to know what they know about the solar system based on the light that reaches us, and based upon results various space missions that have explored other bodies in the solar system.

This course is designed to familiarize you with the universe in which we live, as well as the principles of scientific inquiry that have enabled us to explore and understand that universe.
Required Textbooks: "Astronomy Today" by E. Chaisson and S. McMillan, 9th edition

Blackboard Login Instructions

Access to MyMason 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.

Mastering Astronomy Instructions:
For assignments, quizzes, and exams Mastering Astronomy will be used. Follow the instructions and announcements on Blackboard for registering for Mastering Astronomy.

Overall Goals of the Course:

The overarching goal of this course is to provide the student with a "big-picture" view of the Solar System and Earth's place in the universe. The recent discoveries of thousands of diverse exoplanets, and at many different stages in their evolution, have provided a wealth of new information about how planets form and evolve. Thus this course will also include very recent discoveries about exoplanets, and how understanding them will help us understand our own solar system and the implications life elsewhere.

Course Objectives:

By the end of the course the students will understand:

- The scientific method and how we apply it to investigate the universe;
- The size and scale of the solar system, galaxies, and the universe;
- How the motions of the Earth affect our view of the sky over days, months, and years; including lunar and solar eclipses;
- The causes of the seasons;
- The basic physical laws that govern the motion of objects, including the planets;
- What light is, how it works, and how we use it to study distant objects;
- How light and matter interact;
- How the solar system was formed and has evolved over time;
- Comparative planetology
- The physical characteristics of the individual planets, including their compositions, atmospheres, and the physical processes that dictate these properties;

Lectures: The lectures will follow the chapters of the text; additional materials that represent recent discoveries in planetary science will also be presented in class. You are responsible for all of the material covered in lectures, in addition to that presented in the text. You should read the assigned chapters BEFORE they are discussed in class; this will enable you to ask questions in class if you do not understand some aspect(s) of the chapters.

You are expected to spend at least as much time studying on your own as you spend in the classroom.

Lectures and Presentations: Each lecture will be given via blackboard Collaborate Ultra.

Attendance: Because you are responsible for all materials or announcements (including exam information, and e.g., change in dates), attending the online classes is essential. Oral announcements

made in class are binding and it is your responsibility to find out what has occurred in any class you might miss.

Course format:

(1) Lectures covering material in the textbook.
(2) Reading assignments from the text
(3) Weekly in-class quizzes (every Monday starting on 8 June 2020)
(4) Weekly homeworks
(5) One in-semester exam (during the last day of the lecture)

Course Schedule

Week 1	**Lesson 1:** Introduction Chapter 1: Charting Heavens Chapter 2: Copernican Revolution Chapter 3: Radiation	• **Read Chapters 1-3** • **Complete Homework (HW) 1 on MasteringAstronomy**
Week 2	**Lesson 2:** Chapter 4: Spectroscopy Chapter 5: Telescopes Chapter 6 The Solar System	• **Read Chapters 4-6** • **Quiz 1** • **HW 2**
Week 3	**Lesson 3:** Chapter 7: Earth Chapter 8: The Moon and Mercury Chapter 9: Venus	• **Read Chapters 7-9** • **Quiz 2** • **HW 3**
Week 4	**Lesson 4:** Chapter 10: Mars Chapter 11 Jupiter Chapter 12: Saturn	• **Read Chapters 10-12** • **Quiz 3** • **HW 4**
Week 5	**Lesson 5:** Chapter 13: Uranus & Neptune Chapter 14: Solar System Debris Chapter 15: Exoplanets	• **Read Chapters 13-15** • **Quiz 4** • **Exam**

Course Policy and Grading:

Quizzes:	30%
Homework	30%
One in-semester exam:	40%

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.

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