

# ASTR 403: Planetary Science

## Classes

Place: EXPL 1004 (section 001) or online (section 002)

Time: TR 1:30–2:45 (section 001)

In-person classes will be recorded and posted on the course website for both sections.

Website: [www.physics.gmu.edu/~joe/ASTR403.html](http://www.physics.gmu.edu/~joe/ASTR403.html)

## Instructor

Joe Weingartner (he/him)

Planetary Hall, room 231

703-993-4596

[jweinga1@gmu.edu](mailto:jweinga1@gmu.edu)

Office hours: MW 11:00–12:00 (zoom)

## Course Objectives

1. Develop the skills and knowledge needed to participate in research projects in planetary science
2. Reinforce basic physics concepts and skills in a novel setting

## Course Textbook

*Fundamental Planetary Science: Physics, Chemistry and Habitability*, J.J. Lissauer & I. de Pater (Cambridge University Press). Available free online using the GMU Library catalog.

## Evaluation

### Problems, to be worked both in class and at home (100%)

1. You are encouraged to discuss the problems with one another, but the detailed solutions that you submit must be your own, independent work.
2. Do not hesitate to seek help from me, in person or by email.
3. The point value of each problem is indicated in brackets. The total point value will be 870.
4. See the course web site for due dates. Late work will only be accepted in extenuating circumstances (medical or family emergency). If you don't finish the problem set, turn in what you have.
5. The clarity of your solutions will factor significantly into your grade. It is not sufficient to write a few equations. You must define your variables, draw well labeled figures where appropriate, and explain what you're doing. Use the distributed solutions as a guide for the level of detail required. Also, you must write legibly. I will not struggle to decipher handwriting; instead, I will simply assign zero points.
6. Each week, I will choose a fraction (possibly 100%) of the submitted problems to grade. Of course, I will not reveal in advance which problems will be graded. Your total earned points for each submission will be  $AB/C$ , where  $C$  is the total number of points in the graded problems,  $A$  is the number of points you earned on those problems, and  $B$  is the total number of points in the problems on which you made a serious effort.
7. Unless explicitly stated, you may not use computer programs like Mathematica.

8. When a problem asks you to “show” something, this should be interpreted as “derive” rather than “verify.”

Letter grades for the course will be determined from total numerical grades as follows:

A range: 90-100%

B range: 80-90%

C range: 70-80%

D: 60-70%

F: < 60%

## **Course Outline**

1. Inventory of the Solar System
2. Dynamics
3. Background Physics
4. Brief Overview of Star Formation
5. Earth’s Atmosphere
6. Earth’s Surface and Interior
7. Terrestrial Planets and Satellites
8. Giant Planets
9. Minor Planets, Comets, and Meteorites
10. Exoplanets
11. Planet Formation

## **Civility and Inclusion**

The Department of Physics and Astronomy is committed to civility and inclusion. All members, including instructors and students, are expected to abide by the department’s Code of Professional Conduct.

## **Department/University Resources**

Spectrum peer-mentoring program for physics and astronomy students

Incident Report Form

Academic Integrity

Disability Services

Learning Services

Student Support and Advocacy Center

Counseling and Psychological Services