

Syllabus  
PTYS 403/503 – Spring 2019  
The Physics of the Solar System

**Course Description:** The goal is to give a survey of planetary science with an emphasis on quantitative aspects of the physics of the solar system. The emphasis throughout will be on basic physical processes and the various approximations used in their application to realistic and relevant problems. Broad aspects of solar-system physics will be covered, including: planetary orbits, dynamics of smaller bodies and dust in the solar system, the nature and origin of light, radiative transfer, solar system formation, planetary interiors, surfaces and atmospheres, solar-system magnetism, the Sun, asteroids, comets, and extrasolar planets. A more-detailed list of topics is given in the attached tentative lecture schedule. This is a co-convened undergraduate/graduate course. The lectures and material will predominantly be aimed at the advanced undergraduate level. Students enrolled in 503, the graduate section, will be required to do some additional, perhaps more-challenging assignments (c.f. the grading policy below), as well as a term paper and possibly an in-class presentation.

**Meeting Time:** T, Th 9:30-10:45AM – Kuiper Space Sciences Room 312

**Instructor:** Joe Giacalone, Professor of Planetary Sciences

Office: Kuiper Space Sciences – Room 411

Tel: 626-8365; Email: giacalon@lpl.arizona.edu

Office Hours: after class (or just stop by)

Administrative Assistant: Vicki Robles de Serino (Room 415; tel: 621-9692)

**Teaching Assistant:** Rachel Fernandes, Graduate Student in Planetary Sciences

Office: Kuiper Space Sciences – Room 324

Email: rachelbf@lpl.arizona.edu

Office Hours: Friday, 9:30-10:30AM (or email to discuss additional meeting times).

**Prerequisites:** As quoted in the departmental catalogue of classes, either PHYS142 or PHYS251 is a prerequisite for this class. Basically, you should have some calculus-based physics background as this course will focus primarily on the physics of the solar system and will use calculus-level mathematics, such as derivatives, integrals, vector analysis, and algebra. You should consult with the instructor if you have any questions about your level of preparation for this course.

**Grading:** Your final grade will be based on a cumulative performance on homework and exams. Final grades may be based on a common statistical curve, but you are assured of the following grade based on your overall final average: (A) 90% or above, (B) 80-90%, (C) 70-80%, (D) 60-70%. The weighting of the assignments is as follows:

**Students enrolled in 403**

50% Problem sets (~5 assignments)

25% Average of 2 mid-term exams

25% Final Exam

**Students enrolled in 503 (graduate credit)**

45% Problem sets (~5 assignments\*)

20% Average of 2 mid-term exams

20% Final Exam

15% Term Paper and presentation (details will be announced in class)

\* there will likely be an additional problem or two. Per homework assignment, for students enrolled in the 503.

**Assignments and Exams:** There will be ~5 homework assignments during the course. The assignments will be announced in class and will be available for download from the course website. The assignment must be turned in on the due date at the beginning of class, generally one week after it is assigned. Solutions to the homework assignments will be made available on the website. Late homework will usually incur a late penalty, and will not be accepted once solutions have been posted on the course website.

There will be two mid-term exams, both of which will take place during the regular class period in the same room as the lectures. The tentative dates are given in the attached lecture schedule and are also available on the course website. The final exam is currently scheduled for Tuesday, May 7 from 8:00-10:00AM, also in the same room as the lectures.

**Textbook:** There is no required textbook for this course. Much of the material to be covered in this class can be found on the internet, and the instructor will provide the relevant links, or instructions in class. There are, however, a number of relevant and possibly useful books that cover some of the material that will be covered in this class. They include:

1. "Planetary Sciences" Imke de Pater and Jack J. Lissauer, Cambridge University Press
2. "Worlds Apart: A Textbook in Planetary Sciences" Consolmagno and Schaefer, Prentice Hall
3. "Physics and Chemistry of the Solar System (revised edition)" John S. Lewis, Academic Press
4. "Planetary Science: The Science of Planets Around Stars" G.H.A. Cole, M. M. Woolfson, Institute of Physics Publishing
5. "The Solar System (second edition)" John A Wood, Prentice Hall
6. "Moons and Planets (fifth edition)" William. K. Hartmann, Cengage Learning
7. "Universe" Freedman and Kaufman, WH Freedman and Co.

**Course Website:** (either of these will work)

[www.lpl.arizona.edu/classes/Giacalone\\_403](http://www.lpl.arizona.edu/classes/Giacalone_403)

[www.lpl.arizona.edu/classes/Giacalone\\_503](http://www.lpl.arizona.edu/classes/Giacalone_503)

The website will post class lectures (scanned transparencies in pdf format, some PowerPoint slides and movies), and solutions to homework.

### **General Policies:**

**Academic Integrity:** For general guidelines on this, please refer to the University's code of academic integrity: <http://deanofstudents.arizona.edu/codeofacademicintegrity>

With regards to homework for this class, you are encouraged to work with other students; however, the work that you turn in must be your own.

Attendance: This course will adhere to the University's policy on attendance. Below are the relevant links.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

.The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Note, although lectures and assignments will be posted on the course website, success in this course will require that you attend and participate in each class

Threatening Behavior Policy: This course will adhere to The UA Threatening Behavior by Students Policy, which prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Accessibility and Accommodations: It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Non-discrimination and anti-harassment policy: This course will adhere to the UA Nondiscrimination and Anti-harassment Policy. The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

**Note that the workload and course requirements are subject to change at the discretion of the instructor with proper notice to the students.**