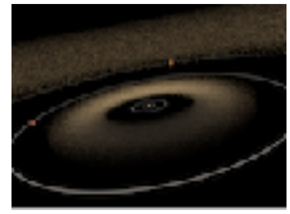

PTYS/ASTR 553 Solar System Dynamics

Syllabus

Spring 2018: Tues, Thur 9:30-10:45 a.m. – Kuiper Space Sciences Building Room 312

First class meeting will be on January 16

Prof. Renu Malhotra
http://www.lpl.arizona.edu/~renu/
Kuiper Space Sciences 515; (520)626-5899; renu@lpl.arizona.edu
Office hours: Anytime I am around and not busy with something or someone else; for guaranteed time, please make an appointment.

Course Description: This course develops quantitative skills to analyze and understand the orbital motions of planets, moons, minor planets and dust complexes in planetary systems, both in our solar system and in extra-solar systems. There will be applications to phenomena such as secular perturbations and resonant effects in the solar system and in extrasolar planetary systems, the assembly of resonant orbital configurations, planet formation and migration, and stability and chaos in the asteroid belt and the Kuiper belt. The course is intended for beginning planetary science and astronomy graduate students; graduate and advanced undergraduate students from across the University are also welcome. Basic vector calculus and ordinary differential equations will be used, and familiarity with classical mechanics will be needed; some of this will be reviewed in this course.

Pre-requisite(s): Vector Calculus, Ordinary Differential Equations, Classical Mechanics. Students should also be (or become) proficient in a programming language and graphics software (examples: Fortran, C, GnuOctave, Matlab).

Textbook: "Solar System Dynamics", by C.D. Murray and S.F. Dermott, Cambridge University Press, UK, 1999. It is available in paperback.

Class Web Page: You will need a UA Net ID to access the class web page at the UA's D2L website, http://d2l.arizona.edu. I will use the class webpage to post class notes and assignments, and other communications. This webpage will be updated frequently throughout the semester.

Grades: Regular letter grades are awarded for this course, with a default grading scale of: A — 90-100%, B — 80-89%, C — 70-79%, D — 60-69%, E — 0-59%. The instructor reserves the right to adjust the grade boundaries based on her expectations of student performance.

There will be frequent homework assignments; a random selection of approximately 50% of the assignments will be graded over the course of the semester. The final exam will be comprehensive; it will be open notes, textbook and calculators permitted. Grades will be based on the greater of: the final exam or a weighted average of the final exam and the graded homework assignments.

PTYS/ASTR 553 Solar System Dynamics

Syllabus

UA Academic Policy notice: The University's policies are available at http://www.lpl.arizona.edu/resources/academic/policies. I expect students to be ethical, and to be cognizant of and to abide by the relevant policies on academic integrity and classroom behavior, and the use of University resources.

Subject to Change Statement: The workload and course requirements other than the grading and absence policy are subject to change at the discretion of the instructor with proper notice to the students.

Approximate schedule (subject to change):

- Introduction, Two body problem [3 weeks]
- Three body problem [3 weeks]
- Perturbed orbits, secular and resonant perturbations [5 weeks]
- Numerical methods [2 weeks]
- Chaos [2 weeks]