UCSD DEPARTMENT OF PHYSICS **Sept. 2000**

PHYSICS 9: THE SOLAR SYSTEM

TOPICS NOT YET DETERMINED: Web Pages, TA office hours

Course Lectures: Tu Th 2:20-3:40 Center 105

Instructor: Prof. David Tytler, Room 428 SERF, 858-534-7670, tytler@ucsd.edu,
Office Hours: Tu 1:10-2:00 Science and Engineering Research Building (SERF) 329.

Course Secretary: Barbara Lowe, Physics Student Affairs Office, 115 Urey Hall Annex, 534-1745 blowe@ physics.ucsd.edu

Secretaries in Instructor's Building, SERF room 408:
Cheryl Matson (cmatson@cass01.ucsd.edu 534-3460),
Shirley Roy (sroy@ucsd.edu, 534 2690)

Teaching Assistant: Eric Nelson (etnelson@physics.ucsd.edu)
Grader: Amber Hatfield (Rebmalyne@cs.com)

Course Description: Physics 9 is our basic introduction to the solar system for non-science majors who have no experience with astronomy, physics or maths. Your goal is to become familiar with the scientific way of thinking and solving problems. The solar system provides exciting and visually dramatic examples.

We discuss: (1) The objects in the solar system: the sun, planets, their moons, the asteroids, comets and meteors. (2) The formation of these objects and their evolution. (3) The basic physics needed to understand these topics, including gravity, orbits, atoms, light, spectra, heat and energy. (4) The scientific method, including research tools such as telescopes and some history. (5) The unity of scientific ideas.

Two related courses, Physics 5 and 7 cover the whole of astronomy, including the stars, galaxies and cosmology. These courses are at a similar level, but the spend much less, or no time, on the solar system.

Mathematics:

Some familiarity with algebra and geometry would help, but none is needed. We occasionally use graphs (both histograms and x-y plots), equations with powers (exponents), proportion, angles, triangles, and logs.

The required text is *The Planetary System* David Morrison & Tobias Owen, 2nd edition, 1996, Addison Wesley Publishing, ISBN 0-201-55450-X.

Class Activities: We will follow three steps:

1. As we start each topic, I will summarize the main pints and explain the technical terms and physics concept which are mentioned in the book.
2. You should then read the relevant part of the book and prepare questions for discussion.
3. The next time we meet, we will discuss your questions about the material which you read. Sometimes we will do practice exam questions.

GRADES.

First Midterm 15% Thurs Oct 19
Second Midterm 25% Tue Nov 14
Homework 30%
Final 30%

Please bring following to exams: B2 pencils, GREEN scantron form, blue-books for written answers.

All exams may include anything from the lectures and homework. Some of the questions will simply test your memory, but most will require you to understand and use the ideas that were presented in the lectures. All three exams will be cumulative, meaning that they can include any topic covered up to that time, including those already covered in an earlier exam.

Your numerical (not letter grade) score on each of the exams and the homework will each be scaled so that the maximum possible score (not the average of the actual scores) contributes the appropriate percentage of the total score. The letter grade will be assigned to the sum of these scaled scores. We will not "curve" the grades, so the grade that you receive depends only on your performance and not on that of the best or worst or average students in the class. The pass/no pass point is decided by inspecting the answers of the relevant exams. There is no pre-determined percentage score to pass, and there is no pre-determined percentage of people who will get a given grade.

We will give each of you a **code numbers** for this course. You should write this, and not you name, onto all homework and exam material. Graded material will be left in a physics lab in WLH, ground floor, West (Price Center) side of building.

DISHONESTY and CHEATING. Read the UCSD *General Catalog* entry on "Dishonesty, Academic" (p.72 in the 1998-99–00 editions). These rules will be enforced. Cheating includes submitting another work as your own, copying from another person, allowing someone to copy from you, and using unauthorized materials during an exam. You should do homework on your own and ask TAs and the instructor for advice and help. **If you work in a study group you must (1) write down the names of all in the group (including any tutors) on each homework, and (2) do all your own calculations, and use entirely your own wording for all answers.**

If you copy from a book or anywhere else, you must write down the reference (including page numbers) and show exactly what you copied with quotation marks. We will compare homework, and all which appear to be copies will be sent to the Deans. First offenses usually result in academic probation.

Other Texts on the Solar System

Jones, Barrie W. *Discovering the Solar System* 1999, Wiley, ISBN 0-471-98243-1 (paper back) $39.95.

Beatty, J.K., Peterson, C.C. and Chaikin, A. *The New Solar System* 1999, Sky Publishing and Cambridge University Press [well written discussion of the topics covered in the course.]

Cattermole, Peter *Earth and Other Planets* (Oxford University Press 1995) [each page has many superb colorful diagrams, not much on other planets, another excellent book to start with.]

Christiansen, E.H. and Hamblin, W.K. *Exploring the Planets* (Prentice Hall 1995) [mostly planetary surfaces, excellent photos and drawings, lacks observational astronomy.]

Greeley, R. *Planetary Landscapes* (Chapman and Hall 1994) [similar to Christiansen.]

Hartmann, W.K. *Moon and Planets.*

Lewis, John S. *Physics and Chemistry of the Solar System* (Academic Press, 1995) [assumes you have 1 year of university physics, chemistry and mathematics].

Seeds, M. *The Solar system* (Wadsworth, 1999) [half of Seeds book *Foundation of Astronomy*, only 110 out of 600 pages are on planets and minor bodies.]

Watters, Thomas R. *Planets* Smithsonian Guides, (MacMillan, 1995) [short, colorful, good book to star with.]

The Search for Life on Other Planets, ISBN 0-521-59837-0 paper, $19.95 Bruce Jakosky, Cambridge Univ. press, 1998 [steps through solar systems, 59p on Mars, good illustrations in black/white, intended for Univ. course.]

Review Articles

Sky and Telescope is a superb monthly magazine, which contains many easy to understand and reliable reviews.

Scientific American magazine usually has one detailed astronomy review each month.

General Astronomy Texts: Similar Treatment of Physics, but usually less details on the Solar System

The Undergraduate Library has other useful texts:

Abell, Morrison & Wolff *Realm of the Universe*

Berman, L. & Evans, J.C. *Exploring the Cosmos* Little Brown

Eric Chaisson & Steve McMillan *Astronomy Today* 1996 (Prentice Hall Upper Saddle River, NJ) [excellent]

Dixon, R.T. *Dynamic Astronomy* Prentice Hall

Ferris, T. *Coming of Age in the Milky Way*

Friedlander, M.W. *Astronomy from Stonehenge to Quasars* Prentice Hall. [harder]

Layzer, D. *Constructing the Universe* [gravity, tides]

Pasachoff, J. *Astronomy, from the Earth to the Universe*

Seeds, M. *Foundation of Astronomy* [well written]

Snow, T. *The Dynamic Universe* [no maths]

Shu, F. *The Physical Universe* [advanced physics, good]

Zeilik, Gregory *Astronomy, the Evolving Universe*

Zeilik, Gregory & Smith *Introduction to Astronomy and Astrophysics* Saunders. [more maths]