

# ASTRO/EPS C12 Course Syllabus

**Dr. Michael H. Wong**  
**Summer Session 2008**

This lecture schedule shows the order in which topics will be covered in the class. Read the assigned book chapters before they are discussed in class, for maximum benefit. The textbook is *Pluto and Charon: Ice Worlds on the Ragged Edge of the Solar System*, 2nd edition (Alan Stern and Jacqueline Mitton, 2005). The 1st edition is not acceptable.

<p><b>08 july</b></p> <p><b>PREFACE / PROLOGUE</b></p> <p>Class orientation. Definition of planet, scientific notation, history of modern astronomy.</p>	<p><b>09</b></p> <p><b>CHAPTER ONE</b></p> <p>Solar system overview, planes, angles, distances, gravity, orbits, phases of the moon.</p>	<p><b>10</b></p> <p><b>CHAPTER TWO</b></p> <p>Telescopes, astronomical techniques and instruments, seasons.</p>
<p><b>15</b></p> <p><b>CHAPTER TWO</b></p> <p>The spectrum, thermal radiation, interaction of light and matter, the scientific method.</p>	<p><b>16</b> <i>PS 1 DUE</i></p> <p><b>PLANETARY INTERIORS</b></p> <p>Internal heat, surface-to-volume ratio, seismic waves, plate tectonics, volcanoes, tides.</p>	<p><b>17</b> <i>QUIZ 1</i></p> <p><b>CHAPTER THREE</b></p> <p>Eclipses, density, differentiation, synchronous rotation, polar caps.</p>
<p><b>22</b></p> <p><b>CHAPTER FOUR</b></p> <p>Atmospheric physics: pressure, temperature, molecular speeds, phases of matter, saturation, scale height.</p>	<p><b>23</b> <i>PS 2 DUE</i></p> <p><b>CHAPTER FOUR</b></p> <p>Atmospheric processes: atmospheric origins, scattering, absorption, photochemistry, greenhouse effect, escape.</p>	<p><b>24</b></p> <p><b>MIDTERM !!</b></p>
<p><b>29</b></p> <p><b>CHAPTER FIVE</b></p> <p>Stellar/planetary formation, brown dwarfs, clouds, disks, planetesimals, the ice line, orbital resonances, dynamical families.</p>	<p><b>30</b> <i>PS 3 DUE</i></p> <p><b>CHAPTER SIX</b></p> <p>Small body populations: asteroids, trojans, Oort cloud, KBOs, comets. Angular momentum, planetary migration.</p>	<p><b>31</b></p> <p><b>IMPACTS</b></p> <p>Meteors, comet dust trails, ablation, craters, erosion, late heavy bombardment, size-frequency distributions.</p>
<p><b>05 aug</b></p> <p><b>CHAPTER SEVEN</b></p> <p>Seasons, atmospheric collapse, volatile cycles.</p>	<p><b>06</b> <i>PS 4 DUE</i></p> <p><b>ASTROBIOLOGY</b></p> <p>Precursors for life, extremophiles, genetic "tree of life," early life, habitable zones and pockets, biomarkers, intelligence.</p>	<p><b>07</b> <i>QUIZ 2</i></p> <p><b>MAGNETIC FIELDS</b></p> <p>Magnetic fields and charged particles, planetary dynamos, solar wind, solar activity, aurorae, remnant fields, field reversals.</p>
<p><b>12</b></p> <p><b>CHAPTER EIGHT</b></p> <p>New Horizons Jupiter encounter, other spacecraft flybys, related science.</p>	<p><b>13</b> <i>REPORTS DUE</i></p> <p><b>REVIEW</b></p>	<p><b>14</b></p> <p><b>FINAL EXAM !!</b></p>

# Basic information

**Instructor:** Dr. Michael H. Wong.

419 Campbell Hall, 510/642-0388, [mikewong@astro.berkeley.edu](mailto:mikewong@astro.berkeley.edu).

I am a research scientist in the Astronomy Department, in the area of planetary science. My primary research focus is on the atmosphere of Jupiter.

**Lectures:** TWTh 2:40–5pm. 2 LeConte.

**Office hours:** TBD.

Office hours are question-and-answer type informal gatherings, where students can get guidance on assignments and help with any questions about material covered in lecture.

**Website:** <http://astro.berkeley.edu/~mikewong/C12.html>

Will contain assignments, solutions, announcements, handouts, extra reading, and copies of lecture slides.

**Facebook group:** <http://www.facebook.com/group.php?gid=8454578428>

A way to earn “fuzzy credit” for participation for those who are too shy to talk in class.

## Grading

At the end of the session, I will calculate a “straight grade” and a “curve grade” for each student, and award the better of the two grades as the final grade for the class.

# Assignments

## Exams

Out of a total of 270 points for the course, the final will be worth 100 and the midterm will be worth 50. Exams will include multiple choice and short-answer questions. **Bring a blue book** with you to the midterm and to the final. Some material will be covered in lecture but not in the book, and some material may be covered in the book but not in lecture. You will be responsible for both lecture and book material on the exams, although the main focus will be on the material covered in lecture.

## Problem sets

Problem sets will be given out in class, and must be handed in by **the beginning of lecture** on the due date. *No late problem sets will be accepted, even if they are only 3 seconds late.* If you are attempting to finish your problem set at the very last minute, it may be better to turn it in incomplete and get partial credit, rather than to try to finish but get the whole thing rejected for being late.

Collaboration with other students is encouraged, but **you must turn in your own unique writeups**. Partial credit will be given for partially correct answers, but only if you show all your work. Drawing nice big diagrams can be very helpful both for your own understanding and for the graders.

## Reports

Two short reports will be assigned, worth the same amount of points as the problem sets. I will drop your lowest problem set or report grade, so out of four problem sets and two reports, only the best five grades will count. Details of the report assignments will be given out in class. Reports are due the day before the final, but can be turned in early.

## Quizzes

Two short quizzes will be given at the end of lecture, a week before the midterm and a week before the final exam. They will consist of short-answer questions.

## *Grading breakdown*

<b>Assignment type</b>	<b>Value each</b>	<b>Total value</b>
Final exam	100	100
Midterm	50	50
Problem sets and short reports (six total, but only best five counted)	20	100
Quizzes	10	20
<b>TOTAL</b>		<b>270</b>

## *Assignment schedule*

<b>Class Date</b>	<b>Assignment</b>
Wed 16 Jul	Problem Set 1 due at beginning of class.
Thu 17 Jul	Short quiz at end of class.
Wed 23 Jul	Problem Set 2 due at beginning of class.
Thu 24 Jul	MIDTERM.
Wed 30 Jul	Problem Set 3 due at beginning of class.
Wed 06 Aug	Problem Set 4 due at beginning of class.
Thu 07 Aug	Short quiz at end of class.
Wed 13 Aug	All reports due at beginning of class.
Thu 14 Aug	FINAL EXAM.