Course	**Comparative Planetology** SCI 5327
Professor	Mary L. Urquhart (Kelly)
Term	Fall 2009
Meetings	Monday evenings (5:30-8:15) in FN 3.206. Some course work will be online.

Professor's Contact Information

Office Phone	972-883-2499
Other Phone	972-883-2496 (main office)
Office Location	FN 3.308F
Email Address	urquhart@utdallas.edu
Office Hours	Mondays 1:30-2:30 pm, Wednesdays 3:00 – 4:00 pm, immediately after class and by appointment.
Other Information	Assignments should be submitted through WebCT, or on paper when necessary. Other correspondence with the instructor should be by regular email.

General Course Information

Pre-requisites, Co-requisites, & other restrictions	No prior astronomy or geology course work is required. However, this is a graduate course, and all students will be expected to be able to understand, synthesize, apply, evaluate, and use course content creatively, as well as develop the foundation necessary to extend the exploration of course topics independently and to find current and evaluate current information in the dynamic field of planetary science. Students will be expected to draw from their own backgrounds in physics, astronomy, geology, and/or teaching during class participation and group projects.
Course Description	Comparative Planetology will engage students in an exploration of the physical properties of, and underlying principles that shape, the planets, dwarf planets, natural satellites, and small solar system bodies that orbit our nearest star, the Sun. Our most familiar and best-studied planetary body, the Earth, will be compared with each of the other objects we will encounter in our journey through the solar system.
Learning Outcomes	At the completion of this course, the successful student will: • Demonstrate an understanding of the concepts and physical principles related to basic physical properties of planets and why planetary objects differ from one another to an 80% level on written responses on thought questions and post-instructional journals. • Apply critical thinking skills to reasoned arguments in quizzes and in class discussions. • Show an ability to utilize and critically evaluate classroom applications of the science content related to planetary science, including hands-on activities that can be used with pre-college students, through instructor-observed performance in small group work and class discussion and written journals to an 80% level. • Demonstrate an understanding of some of the major findings

	of recent planetary science research and how they apply to teaching and learning of Earth and space science concepts in class discussions and to an 80% level in written post journals. • Demonstrate an awareness of how new discoveries drive changes in scientific understanding in responses on applicable quiz questions to within 80% of possible points in the rubric. • Design a final project that demonstrates the ability to synthesize and apply course content in the creation of a new application or teaching resource to at least 80% of possible points in the project rubric.
Required Texts & Materials	• *The New Solar System*, 4th edition. The mass-market paperback version of this book is acceptable but is no longer in print. A more expensive textbook version remains in print. Chapter reading assignments will be made from this text starting the 2nd week of class. • A scientific calculator will be useful in most, if not all class meetings. Please bring yours to each class session. • Access to a computer and the Internet outside of class, including eLearning Access.
Suggested Texts, Readings, & Materials	An excellent but more mathematically oriented text is *Moons and Planets*, by William Hartmann. Because this is only a suggested supplementary text, either the 4th or 5th edition will be acceptable. This book may not be substituted for the required text. Planetary science is a very dynamic field. Additional readings will be handed out in class and/or posted on Web CT.

Assignments & Academic Calendar

[Topics, Reading Assignments, Due Dates, Exam Dates]

August 24	1. Scale in the Solar System: Why it Matters • Begin Tour of Planets with online resources. *Assigned Reading: Handed out in class*
August 31	2. Earth as a Planet: • Earth systems: solid Earth, atmosphere, water, and life *Assigned Reading: Ch.9 Planet Earth*
September 7	**No Class: Labor Day**
September 14	3. Earth as a Planet: • Planetary Processes • Resources Abound *Assigned Reading: Ch. 10 The Moon and Ch. 6 The Role of Collisions*
September 21	4. Impacts: Worlds in Contrast, the Earth and Moon • Role of impacts in Earth systems • Dating planetary surfaces *Assigned Reading: Ch.2 Origin of the Solar System and Ch. 24 Comets*
September 28	5. Planetary Origins: A Lunar Record to Star Birth • The signatures of giant impacts and late heavy bombardment • Distant stars and distant worlds

	Assigned Reading: Ch. 25 Asteroids and 26 Meteorites
October 5	6. Stories in Stone and Ice: Small Solar System Bodies • Asteroids • Comets • Meteorites *Assigned Reading: Ch. 7 Mercury and Ch. 13 Atmospheres of the Terrestrial Planets*
October 12	7. The Mysteries of Mercury *Assigned Reading: Ch. 8 Venus and Ch. 12 Surfaces and Interiors of the Terrestrial Planets*
October 19	8. Venus • Earth's "Evil" Twin? • A glimpse of our future *Assigned Reading: Ch. 11 Mars*
October 26	9. Mars: How Warm, How Wet? How Earth-like? *Assigned Reading: Ch. 27 Life in the Solar System*
November 2	10. Mars and the Challenges of Planetary Exploration *Assigned Reading: Ch. 14 and 15 Interiors/Atmosphere of the Giant Plants*
November 9	11. Giant Planets • Gas and gravity • Ice giants *Assigned Readings: Ch. 17 Io, Ch 18 Europa, and Ch. 19 Ganymede and Callisto*
November 16	12. Worlds of their own: Icy worlds of the Outer Solar System *Assigned Reading: Ch. 20 Titan*
November 23	13. Titan: Earth in the Deep Freeze? *Assigned Readings: Ch. 21 Triton, Pluto and Charon, and Ch. 5 Cometary Reserviors*
November 30	14. Little Objects Everywhere: Small Moons, Kuiper Belt, and the Oort Cloud
December 7	Presentation of Final Projects

Course Policies

Grading (credit) Criteria	**Pre-Journals, Discussions, and Group Work** (10%): Much of the class will be done in the style of an educator workshop. You will be expected to be an active participant in all activities and in class and online discussions and contribute to the learning environment for your classmates. **The quality of your contributions and the evidence of deep thinking and development of understanding will be part of this grade.** **Reflective Journaling** (10%): You will be required to do reflective journaling on the classes and assigned readings. Specific journal questions

may be given in class or through eLearning.

Weekiy Quizzes (also called Thought Questions) (40%): Every class meeting, one or more thought questions will be asked of the class to probe each student's understanding of the topics discussed. Answers to the questions must be in your own words. Questions will generally be take home and due by the next class meeting unless otherwise specified. All quizzes will be graded on a 10 point scale:

Content:

4 point: Excellent. Complete, correct and clear. Little or no corrections are necessary.

3 points: Good. Minor problems with the answer in content, completeness, or clarity.

2 points: Fair. Requires at least one major correction or revision. Consider redoing the quiz.

1 point: Poor. Serious flaws in the answer. Turning in a redo of the quiz is strongly recommended.

0 points: Did not address the question asked**.** Please try again.

Thoroughness (not length!):

4 point: Excellent. Answer is thorough and demonstrates the student has thought critically deeply about the question.

3 points: Good. Answer is acceptable and demonstrates a reasonable amount of critical thought about the question.

2 points: Fair. Answer is not thorough.

1 point: Poor. Answer does not demonstrate sufficient thought or effort.

0 points: Did not address the question asked**.** Please try again.

Other:

1 point: Readability: Answer is clear, legible, understandable, and does not ramble.

1 point: References are given when necessary and are accurate.

Note: these quizzes are generally given in place of exams. An initial grade of 50% or less on three or more quizzes may result in you being required to take a final exam.

Small Projects: (20 %): A small project is generally an experiment or set of observations you will conduct on your own. These projects are not meant intended to be extremely time consuming but to extend your learning beyond the classroom setting. Examples of small projects:

	• Systems concept maps • Mini-paper on Lunar and Planetary Science Conference abstracts. • Interactive online mapping programs • Crater dating of planetary surfaces **Final Project** (20 %): Each student is required to select, complete, and present a final project to the class. You may partner with a classmate with approval from the instructor. Examples of projects: • A 5 E format lesson plan, with necessary background information related to planetary science. • A "proposal" for a new astronomy space-based mission. • A creative project such as a game or children's book on that demonstrates solid understanding of the science content (with an emphasis on concepts) and would assist students in developing their own scientific understanding of an Earth/space science topic addressed in this course at the appropriate to the intended developmental level. • A term paper *and* accompanying poster or PowerPoint presentation on a planetary science topic. **Revisions:** Whenever reasonable, you may redo take-home quizzes, and post-journals to **earn back up to half** of your missed points, unless otherwise stated by the professor. Such revisions must be submitted in a timely manner, and will be held to the same standards as the original assignment. We will discuss assignments, including quiz questions, in class. Revisions must demonstrate an individual understanding of the material rather than a summary of the class discussion. If a redo of your project is necessary, it may result in a grade of incomplete in the course.
Make-up Exams	**By arrangement with the professor**
Extra Credit	**NA**
Late Work	**Accepted only at the discretion of the professor**
Special Assignments	**If you need special arrangements, talk with the instructor as soon as possible.**
Class Attendance	**Attendance of all courses and field trips is required! You *must* get all absences excused by the professor, in advance if possible.**
Classroom Citizenship	**This is a graduate class and students are expected to behave accordingly. Your presence should enhance rather than detract from the learning of your classmates. Your classroom citizenship is part of your participation grade.**
Field Trip Policies	**Both field trips are day or evening trips, and will require you to arrange your own transportation.**
Student Conduct and Discipline	The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year. The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and

	described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391). A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.
Academic Integrity	The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work. Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings. Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.
Email Use	The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.
Withdrawal from Class	The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.
Student Grievance Procedures	Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*. In attempting to resolve any student grievance regarding grades, evaluations, or other

	fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.
Incomplete Grades	As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.
Disability Services	The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m. The contact information for the Office of Disability Services is: The University of Texas at Dallas, SU 22 PO Box 830688 Richardson, Texas 75083-0688 (972) 883-2098 (voice or TTY) Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance. It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.
Religious Holy Days	The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

	The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment. If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.
Off-Campus Instruction and Course Activities	Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean.

These descriptions and timelines are subject to change at the discretion of the Professor.