

APPLICATION FOR NEW COURSE

1. Submitted by the College of Arts and Sciences Date: 23 February 2009

Department/Division proposing course: Earth and Environmental Sciences

2. Proposed designation and Bulletin description of this course:

a. Prefix and Number GLY 310

b. Title Explorations of the Solar System

*If title is longer than 24 characters, offer a sensible title of 24 characters or less: Explor Solar System

c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week.

CLINICAL COLLOQUIUM DISCUSSION LABORATORY LECTURE
 INDEPEND. STUDY PRACTICUM RECITATION RESEARCH RESIDENCY
 SEMINAR STUDIO OTHER – Please explain: _____

d. Please choose a grading system: Letter (A, B, C, etc.) Pass/Fail

e. Number of credit hours: 3

f. Is this course repeatable? YES NO If YES, maximum number of credit hours: _____

g. Course description:

Fundamental and current topics in the space exploration of our solar system. Topics and examples of themes include: What is a planet; critical evaluation of the evidence for the heliocentric system; electromagnetic waves; the threat of asteroid impact; critical evaluation of the possibilities of extra-terrestrial life; critical evaluation of the evidence for climate change; and other topical items based on the results of on-going space missions.

h. Prerequisite(s), if any:

completion of one and concurrent enrollment in another.
Any two university science/math courses or

i. Will this course also be offered through Distance Learning? YES NO

If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based Interactive video Extended campus

3. Supplementary teaching component: N/A or Community-Based Experience Service Learning Both

4. To be cross-listed as: _____ / _____
Prefix and Number printed name Cross-listing Department Chair signature

5. Requested effective date (term/year): Spring / 2012

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6. Course to be offered (please check all that apply): Fall Spring Summer
7. Will the course be offered every year? YES NO
GLY 310 will be offered jointly with AST 310 under this topic once every three years (two other P&A professors teach other topics under AST 310. With the addition of this course, a 3 year rotation will be established for AST 310.
If NO, please explain: _____
8. Why is this course needed?
Space exploration has made us aware of a number of aspects of the physical and biological world that inspire curiosity and raise various ethical questions important in today's world. This course attracts wide variety of majors in the university.

9. a. By whom will the course be taught? Dhananjay Ravat
- b. Are facilities for teaching the course now available? YES NO
If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?
15-20 students once every 3 years
11. a. Will this course serve students primarily within the department? Yes No
- b. Will it be of interest to a significant number of students outside the department? YES NO
If YES, please explain.
So far this course has attracted majors from all across the campus.
12. Will the course serve as a University Studies Program course[†]? YES NO
If YES, under what Area? _____
[†]AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.
13. Check the category most applicable to this course:
- traditional – offered in corresponding departments at universities elsewhere
- relatively new – now being widely established
- not yet to be found in many (or any) other universities
14. Is this course applicable to the requirements for at least one degree or certificate at UK? Yes No
15. Is this course part of a proposed new program? YES NO
If YES, please name: _____
16. Will adding this course change the degree requirements for ANY program on campus? YES NO
If YES[†], list below the programs that will require this course:

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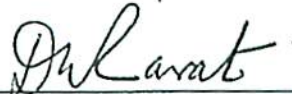


16. Will adding this course change the degree requirements for ANY program on campus? YES NO
 If YES[†], list below the programs that will require this course:
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[†]In order to change the program(s), a program change form(s) must also be submitted.

17. The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18. Check box if course is 400G or 500. If the course is 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)
19. Within the department, who should be contacted for further information about the proposed new course?

Name: Dhananjay Ravat Phone: 257-4726 Email: dhananjay.ravat@uky.edu (preferred)

20. Signatures to report approvals:

<p style="text-align: center;"><u>25 March 2009</u></p> <p>DATE of Approval by Department Faculty</p>	<p style="text-align: center;"><u>Dhananjay Ravat</u> / </p> <p>printed name Reported by Department Chair signature</p>
<p style="text-align: center;"><u>4/22/09</u></p> <p>DATE of Approval by College Faculty</p>	<p style="text-align: center;"><u>Ted Schatzki</u> / </p> <p>printed name Reported by College Dean signature</p>
<p style="text-align: center;"><u>11-3-09</u></p> <p>* DATE of Approval by Undergraduate Council</p>	<p style="text-align: center;"><u>SHARON GILL</u> / </p> <p>printed name Reported by Undergraduate Council Chair signature</p>
<p>* DATE of Approval by Graduate Council</p>	<p style="text-align: center;">/</p> <p>printed name Reported by Graduate Council Chair signature</p>
<p>* DATE of Approval by Health Care Colleges Council (HCCC)</p>	<p style="text-align: center;">/</p> <p>printed name Reported by Health Care Colleges Council Chair signature</p>
<p>* DATE of Approval by Senate Council</p>	<p style="text-align: center;">Reported by Office of the Senate Council</p>
<p>* DATE of Approval by University Senate</p>	<p style="text-align: center;">Reported by Office of the Senate Council</p>

*If applicable, as provided by the *University Senate Rules*. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

GLY 310 Explorations of the Solar System

University of Kentucky

Spring 2009

TR 2:00-3:15 PM, SRB 203

Instructor: Prof. D. Ravat

Office: SRB 305A (Inside office)

Phone: 257-4726

E-mail: dhananjay.ravat @ uky.edu

Office Hours: Tuesdays 3:15–5:00 PM, Thursdays 3:15-4:00 PM, and by appointment

Required Textbook: The Planetary System, Morrison, D., and Owen, T., 2003, Third Edition, Addison-Wesley.

Space exploration has made us aware of a number of aspects of the physical and biological world that inspire curiosity and raise various ethical questions important in today's world. We will look at the science behind some of these issues, exploring deeper into phenomena we observe on the Earth, the planets, the moons and other objects in the solar system. Some of the topics we will cover are: the threat of an asteroid impact to Earth and issues involved in avoiding it, exploration and detection of life and life-supporting environments in the solar system, and several facets of the global warming debate. We could also explore any other related topics of interest to students in the class (as long as they are brought up early in the course, so there is enough time to do the background work). In each of these topics, we will look at the background material, analyze the evidence, and, for topics for which there is no firm evidence, discuss opposing viewpoints. The broad goal of this course is to learn to understand the evidence related to natural phenomena operating in the solar system and using the evidence develop the ability to deal with ethical issues that concern us in today's world.

Prerequisites: any two university science/math courses or concurrent enrollment. We will use high school level math and introduce all necessary physics, geology, and other scientific background. Some planetary/astronomical background will also be covered during the semester.

Course Goals

With a better than average performance in this course, and with some diligence and effort, a student completing this course should:

- be able to explain what is the origin of the solar system; what is and what may not be a planet, what is a meteorite, asteroid, comet, and moon
- be able to explain the evidence that the solar system is not geocentric
- be able to explain how, and why, the distance matter can be chemically identified through the analysis of electromagnetic spectrum
- be able to perform simple basic scientific experiments to identify unknown substances through the analysis of electromagnetic spectrum
- be able to explain how proxies such as density and other physical properties can tell us about the subsurface physical structures and chemical compositions of planetary bodies
- be able to examine different kinds of meteorites in hand specimens, observe their differences, infer their origin, and appreciate that they are exotic space materials from other planets and moons and some groups of them are from the times at the formation of the solar system
- be able to critically analyze topical issues in the fields of earth and planetary sciences (examples: assess evidence for and against existence of extra-terrestrial life; assess evidence for and against climate change and global warming; examine data and exciting results from new and ongoing space missions)
- via the term paper and annotated bibliography assignment, be able to demonstrate critical thinking

Course Requirements and Grades

Three exams (including the final) (essay and short answers - no multiple choice) (total ~ 60%)
In-class laboratory and other assignments (total ~ 15%)
Homework assignments (total ~10%)
Writing assignments (in-class, short assignments, and a paper and annotated bibliography) (total ~ 15%)

Note: 10% equals one letter grade. Thus, doing well in all these components is very important in getting a good grade. Total 300

The following minimum letter grades based on an absolute standard: a total score of 270 points (90%) will be an A, 240 (80%) will earn a B, 210 (70%) will earn a C, and 180 (60%) will earn a D.

A significant fraction of your grade depends on work that begins early in the semester. You will not be able to make up for missed work later in the semester.

Writing Assignment

A brief (approximately 5-page double-spaced) paper and an annotated bibliography (length as appropriate) about a related topic of current planetary science research. You can start thinking about the topic, make an outline of what you will include in it based on the preliminary references you have read (including the preliminary annotated bibliography), and get these details approved by me within the first month of the class. In order to not waste time, you should discuss with me a few suitable topics that interest you within the next couple of weeks. More detailed information on this assignment will be posted on the course web page and discussed in the classroom. The ideas expressed in the papers must be written in your own words and appropriately cited and referenced. (Even half a sentence should not be duplicated from the web resources or original reference materials.)

Homework

There will be a few homework problems as necessary over the semester. Working and understanding all the assigned problems will help you in this class. The work you turn in must be your own, and must be written in your own words. If you do work with others, you must identify them by name on your homework papers. You may write your homework assignments by hand, but they must be clear and legible.

In-Class Participation

Classroom activities and exercises are a regular part of class meetings. These are designed to help you learn concepts involved in planetary science. Completion of these assignments will contribute toward your grade. Your involvement by asking and answering questions during class will also be considered in your class participation grade.

Course Policies

All written assignments, including homework, must be turned in on paper, and the 5-page paper should also be submitted electronically in word or txt format. Late submission of assignments will be penalized. Homework will receive no credit if submitted after the due date.

Policy on Academic Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@eamil.uky.edu) for coordination of campus disability services available to students with disabilities.

ACADEMIC INTEGRITY: All assignments, projects, and exercises completed by students for this class should be the product of the personal efforts of the individual(s) whose name(s) appear on the corresponding assignment. Misrepresenting others' work as one's own in the form of cheating or plagiarism is unethical and will lead to those penalties outlined in the University Senate Rules (6.3.1 & 6.3.2) at the following website: http://www.uky.edu/USC/New/rules_regulations/index.htm. The Ombud site also has information on plagiarism found at <http://www.uky.edu/Ombud>. Intellectual honesty is expected and violations (including plagiarism and cheating) will be punished in accordance with University policy described in the Student Rights and Responsibilities code. This policy applies to all assignments and exams.

GLY310 Explorations of the Solar System
Tentative Schedule - changes will be announced during the class

Meeting	Topic	Pre-Reading
1: 15-Jan.	Introduction, Class Organization and Preliminary Material	None
2: 20-Jan.	A grand tour of the solar system	None
3: 22-Jan.	Is Pluto a planet? Assignment: bring to class a list of all points that argue for and against this	Ch. 14 + Research the web
4: 27-Jan.	Trans-Neptunian Objects (continued) Universe and the Solar System	Ch. 17
5: 29-Jan.	Proving the Heliocentric System What are the key pieces of evidence that <u>prove</u> that the solar system is Heliocentric? Assignment: bring to class a list of all points that argue for the Heliocentric system and against the Geocentric System	Ch. 1
6: 03-Feb.	The Sun and the Electromagnetic Spectrum	Ch. 2
7: 05-Feb.	Spectroscopy and Remote sensing	Ch. 2.3 and 3
8: 10-Feb.	Spectroscopy Lab	Bring a calculator
9: 12-Feb.	Minerals and Rocks	Ch. 3
10: 17-Feb.	Minerals and Rocks Lab (Bring the lecture pdf to class)	Ch. 3 and lecture pdf
11: 19-Feb.	Exam 1	
Next Major Theme	The Threat of Near-Earth Asteroid Impact <i>Research the material regarding the validity of the threat, what is being done about monitoring the threat and suggestions put forth to avoid it</i>	
12: 24-Feb.	Meteorites	Ch. 4
13: 26-Feb.	Meteorites 2	
14: 03-Mar.	Meteorites Lab (Bring the lecture pdf to class)	Ch. 4 and lecture pdf
15: 05-Mar.	Asteroids + Threat	Ch. 5
16: 10-Mar.	The Threat of Near-Earth Asteroid Impact discussion Assignment: bring to class a list of points that will allow us to discuss and assess this topic	
17: 12-Mar.	Comets	Ch. 6
	Spring Break	
Next Major Theme	What makes a habitable planet? Research the requirements of life and importance of water to life	
18: 24-Mar. 19: 26-Mar.	Probing the interior of a planet - Gravity Why is Earth Habitable? Seafloor spreading and plate tectonics, Earth's magnetic field, rock magnetism	Ch. 9.1-9.4
20: 31-Mar. 21: 02-Apr.	Planetary Exploration: Surface mapping, planet active or not. The Moon and Mercury - Origin and Interior Venus and Mars Highlights	Ch. 8.1-8.5 Ch. 10 and Ch. 11
22: 07-Apr.	Planetary Moons that could have life	Ch. 15
23: 09-Apr.	Life Possibilities in the Solar System	Ch. 18
24: 14-Apr.	Exam 2	
Next Major Theme	Climate Change: Human Induced or Natural? Find the opposing viewpoints to the argument that the present increased trend in global warming is caused by human activity.	See the Al Gore Documentary "The Inconvenient Truth" on your own
25: 16-Apr.	Global Warming Background	Ch. 9.5-9.7 Ch. 10.2-10.3 (10.8 optional)
26: 21-Apr.	Global Warming Background (continued)	
27: 23-Apr.	Search "The Great Global Warming Swindle debate" on YouTube and Watch parts 0 to 8 (take notes and bring to class)	See the box to the left under the "Topic"
28: 28-Apr.	Analysis of climate data	Will announce
29: 30-Apr.	Is Global Warming a Crisis? Assignment: bring to class a list of points that argue for and against this	Listen to the Intelligence Squared debate media
Tues 5 May	Exam 3 (Tuesday 5 May 1:00 PM SRB 203)	