08-72.

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		~~07-432~~	App-2/3/09	App-2/24/09

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person	Email Address
Ken Coles	kcoles@iup.edu
Proposing Department/Unit	Phone
Geoscience - Natural Sciences and Mathematics	357-5626

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

_____New Course _____Course Prefix Change _____Course Deletion

__X__Course Revision __X__Course Number and/or Title Change __X__Catalog Description Change

Current Course prefix, number and full title	*Proposed* course prefix, number and full title, if changing
GEOS 341 Solar System	GEOS 341 Planetary Geology

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

Current program name	*Proposed program name, if changing*

4. Approvals		**Date**
Department Curriculum Committee Chair(s)		2/4/08
Department Chair(s)		2/4/08
College Curriculum Committee Chair		2-11-08
College Dean	Gary Stewart	2-11-08
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Domaracki TECC	1-26-09
	Mary Ann Rafoth Dean COE-ET	1-26-09
UWUCC Co-Chairs		
	Gail S Sechrist	1-29-09

* where applicable

Received SEP 25 2008 Liberal Studies

Received FEB 14 2008 Liberal Studies

Part II: Description of the Curriculum Change

1. SYLLABUS OF RECORD (NEW)

I. Catalog Description 3 class hours
GEOS 341 Planetary Geology 3 lab hours
4 credit hours
Corequisites: MATH 121, PHYS 111 or instructor permission (3c-3l-4cr)

Materials, motions, and evolution of the solar system, with emphasis on observational methods, mechanics, spatial relationships, geology, and origin of the solar system.

II. Course Objectives
At the end of this course students will be able to:

1) Apply basic concepts from physics, chemistry, and biology to solar system astronomy, for example, gas laws to planetary atmospheres.
2) Explain how the scientific method has been used to solve questions in astronomy, for example, how the size and shape of Earth were determined using concepts and models.
3) Describe Earth as a celestial object, including its motions, seasons, composition, origin, future, and its relationship with Sun and Moon.
4) Summarize the importance of and contributions of space exploration to our scientific knowledge.
5) Describe the basic characteristics of planets, moons, and minor objects of the Solar System and how they are related to one another.

Student outcomes assessment matrix:

Conceptual Framework (Danielson Domain)	Content Standard (NSTA Science Teacher Preparation)	Course Objective	Assessment (*denotes assessment for reporting)
1, 3	1a, 1b	1	Test 1, quizzes
1	2b, 3a, 3b	2	*Test 2, 1st paper, *2nd paper
1, 3	1a, 1b	3	Test 1, quizzes
1, 3, 4	1c, 2a, 4a	4	Test 3, 2nd paper
1, 3	1a	5	Tests 1-3, *2nd paper

III. Course Outline
Lecture

Part A (12 academic hours): Motions and Origin of Solar System
1. Types of Objects in the Solar System
2. Celestial Mechanics
3. Formation of Stars; Origin of the Sun and Planets

Part B (15 academic hours): Evolution of Planets and Other Objects
1. Meteorites, Comets, Asteroids as records of young Solar System
2. Planetary Differentiation: Interiors and Surfaces
3. Planetary Atmospheres
4. Measuring Motion, Size and Time Scales

Part C (12 academic hours): Geology and Processes

1. Impact Cratering
2. Volcanism
3. Tectonics of Solid Planets and Moons
4. Surface Processes
5. Atmospheric Processes
6. Exobiology: Can Life Exist Elsewhere?

Three academic hours are allotted to exams during the semester.
Final exam during final exam period.

Laboratory Exercises (3 academic hours each)

Week 1:	Sky Coordinates and Constellations
Week 2:	Kepler's Laws
Week 3:	Seasons
Week 4:	Moon Motion
Week 5:	Curtate Orbit Plotting
Week 6:	Motion of Planetary Moons
Week 7:	Impact Cratering
Week 8:	Ages of Solid Surfaces
Week 9:	Tectonic Comparison of Planets and Moons
Week 10:	Planetary Positions and Motions
Week 11:	Making a Sundial
Week 12:	Student Lesson Presentations

Two weeks are allocated for evening telescope observations

IV. Evaluation Methods

Each component of the course will contribute to final grade according to:

Exams	30%
Final Exam	20%
Assignments	25%
Laboratory Exercises	25%
Total	100%

Assignments will include short expository papers on solar system objects or processes, a lesson plan, an analysis of a significant problem in planetary geology using imagery and other data, and questions and problem sets based on the reading and lectures

V. Example Grading Scale

The final grade for this course will be determined using the following schedule:

A=90-100%; B=80-89%, C=70-79%, D=60-69%, F=<60%

VI. Attendance Policy

The attendance policy will conform to IUP's undergraduate course attendance policy.

VII. Required textbooks, supplemental books and readings

Hartmann, W. *Moons and Planets (5th edition).* Belmont, CA: Thompson Brooks/Cole, 2005.

Approximately three scientific or education papers will be used periodically throughout the course to supplement textbook readings.

VIII. Special resource requirements
This course will make use of the University planetarium in Weyandt Hall to illustrate various principles of Solar System astronomy.

IX. Bibliography
In addition to the required textbooks and supplemental readings from science and education journals, the following will be used to develop the course curriculum:

Beatty, J. K., C. C. Peterson, and A. Chaikin, eds. (1999) *The New Solar System (4th edition)*: Cambridge University Press Cambridge, England, 421 p.

Broecker, W. S. (1985) *How to Build a Habitable Planet*: Palisades, N.Y., Eldigeo Press, 291 p.

Copernicus, Nicolaus (1543) *De Revolutionibus Orbium Coelestium (The Revolution of the Heavenly Spheres)*: facsimile reprint by Johnson Reprint Corporation, New York (1965), with introduction by J. Müller, 196 p.

Newton, Isaac (1687) *The Principia: Mathematical Principles of Natural Philosophy*, A new translation by I. B. Cohen and A Whitman: Berkeley, Calif., University of California Press (1999), 974 p.

Wilhelms, D. (1987) *The Geologic History of the Moon: U.S. Geological Survey Professional Paper 1348*: Washington, D.C., U.S. Government Printing Office, 302 p.

Wood, C. A. (2003) *The Modern Moon: A Personal View*: Cambridge, Mass., Sky Publishing Corp., 207 p.

2. SUMMARYOF PROPOSED REVISIONS
This course will include an expanded focus on the geology of the planets and minor solar system objects. As a result, the title change and increase from three to four credits is required.

3. JUSTIFICATION/RATIONALE
The course is currently a requirement for the Earth and Space Science Education major, and most of the students who take it are in this major. Increasing the emphasis of geologic topics will make this course appropriate for geology and environmental geology majors as well. Adding one lecture hour per week will allow time for more in-depth learning activities, specifically the in-depth study of one or more problems or issues in planetary geology. Students will utilize available planetary images, spectral data, and other information to reconstruct the geologic history of a class of features, a region of a planet, or a minor body (asteroid or moon).

4. OLD SYLLABUS OF RECORD
This course predates the syllabus of record system; no prior syllabus of record is on file. A copy of the the most recent syllabus of instruction is attached.

Part III. Letters of Support or Acknowledgment
No other departments or programs are affected by this change.

GEOS 341 - The Solar System
Syllabus - Fall 2006

Dr. Kenneth S. Coles
Office: 136 Weyandt
Phone: 7-5626
Email: kcoles@iup.edu

Geoscience Dept.
Office: 115 Walsh
Phone: 7-2379

Goal

To build a solid understanding of the origin and properties of the objects that make up the Solar System so that students will be able to incorporate new material into a cohesive whole.

Objectives

Students will be able to:
1. Relate basic science concepts to their application in astronomy; for example, the gas laws to planetary atmospheres.
2. Understand how the scientific method has been used to solve astronomy questions; for example, how the size and shape of Earth were determined.
3. Demonstrate an understanding of Earth as a celestial object, including its motions, seasons, composition, origin, future, and its relationship with the Sun and Moon.
4. Understand the importance of and contributions of space exploration to our scientific knowledge.
5. Describe and relate to one another the basic characteristics of the planets, moons, and minor members of the Solar System.
6. Develop an understanding of the uses of modeling, instrumentation, and technology in astrometric research.
7. Develop an appreciation for both the beauty and usefulness of the night sky.

Text

Moons and Planets, 5th edition, by William K. Hartmann. A schedule of assigned readings will be given

Lectures Tues and Thurs 1:15-2:15 P.M, Room 134 Weyandt (Planetarium)

Tues	Thurs		
Aug 29	Aug 31	Overview of Solar System	Coordinates & Positions
Sept 5	Sept 7	Celestial Mechanics I	Celestial Mechanics I
Sept 12	Sept 14	Seasons	Celestial Mechanics II Sept 19
	Sept 21	Star formation	Star types & evolution
Sept 26	Sept 28	Solar System formation & Origin of the Planets	**EXAM 1**
Oct 3	Oct 5	Meteorites	Meteorites
Oct 10	Oct 12	Comets	Comets/Asteroids
Oct 17	Oct 19	Asteroids	Planetary Interiors
BREAK	Oct 26	-----	Surfaces of Solid planets
Oct 31	Nov 2	Planetary Timescales	Fluid Planets
Nov 7	Nov 9	**EXAM 2**	Measuring motion/size
Nov 14	Nov 16	Cratering: A geologic process	Volcanism
Nov 21	BREAK	Volcanism	-----
Nov 28	Nov 30	Tectonics	Surface Processes
Dec 5	Dec 7	Atmospheres: A tour	Exobiology

Thursday, December 14, 12:30 P.M. to 2:30 P.M. - **FINAL EXAM**

Lab Schedule (specific lab schedule will be given in class)
Mon. 6:00-9:00 P.M. Weyandt 135 (lab room)

Grading

Test 1	15%	(covers lectures and labs through Sept. 30)
Test 2	15%	(covers lectures and labs from Oct. 6 to Nov. 3)
Final Exam	20%	(a comprehensive test)
Labs	25%	
Assignments	25%	

The three tests will include short answer questions, essay questions, and problem solving. They will cover the readings, lectures, and labs. The exams are closed book, closed door. I will provide plenty of opportunities to practice writing essay answers if they are new to you. I cannot give the exact grading scale until the end of the term, but in the past scores of 90-100% earned an A, 80-89% B, 70-79% C, 60-69% D, 59% and below, F.

Assignments will include some small exercises to be done outside class. There will also be two short papers. One will be a short explanation of an astronomical observation or phenomenon. The second can be presented as a lesson plan and background material for those who are teaching majors and as a short paper for others.