CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by October 15, 2013, and finalized by the end of the fall semester to make the next catalog (2014-15) production


PROGRAM AREA(S): PHYS/ASTRONOMY

Directions: All sections of this form must be completed for course modifications. Use YELLOWED areas to enter data. All documents are stand alone sources of course information.

1. Indicate Changes and Justification for Each. [Mark an X by all change areas that apply and follow-up your justification. Be as brief as possible but, use as much space as necessary.]

   Course title          Course Content
   Prefix/suffix         Course Learning Outcomes
   Course number         X References
   X Units               GE
   Staffing formula and enrollment limits        Other
   Prerequisites/Corequisites       Reactivate Course
   X Catalog description
   X Mode of Instruction

   Justification: We are integrating the activity portion of astronomy into the “lecture” portion and developing a new laboratory course which either ASTRO/PHYS 105 or ASTRO/PHYS 107 would be a prerequisite for.

2. Course Information.
   [Follow accepted catalog format.] (Add additional prefixes if cross-listed)

   OLD
   Prefix PHYS/ASTR Course# 105
   Title INTRODUCTION TO THE SOLAR SYSTEM   Units (4)
   3 hours lecture per week
   2 hours activity per week
   Prerequisites: Consent of Instructor Required for Enrollment
   Corequisites:  

   Catalog Description (Do not use any symbols):
   Descriptive introduction to the astronomical properties of the Solar System. Topics include: the historical development of astronomy, the laws that govern the behavior of the Universe, the properties of the stars and galaxies, including their origin and evolution and the Big Bang theory. Activity sessions will include computer-simulated exercises, and two field trips.

   NEW
   Prefix PHYS/ASTR Course# 105
   Title INTRODUCTION TO THE SOLAR SYSTEM   Units (3)
   3 hours lecture per week
   Prerequisites: Consent of Instructor Required for Enrollment
   Corequisites:  

   Catalog Description (Do not use any symbols):
   Descriptive introduction to the astronomical properties of the Solar System. Topics include: historical development of astronomy, and the laws that govern the behavior of the universe; evolution of the solar system; planetary sciences; planetary exploration; and greenhouse effect.

   General Education Categories: B1

   Grading Scheme (Select one below):
   X A – F
   Credit/No Credit
   Optional (Student’s Choice)
   Repeatable for up to units
   Total Completions 1
   Multiple Enrollment in Same Semester Y/N NO
   Course Level: X Undergraduate

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3. Mode of Instruction (Hours per Unit are defaulted)

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4. Course Attributes:

**B1 General Education Categories:** All courses with GE category notations (including deletions) must be submitted to the GE website: [http://summit.csuci.edu/ge](http://summit.csuci.edu/ge)
Upon completion, the GE Committee will forward your documents to the Curriculum Committee for further processing.

- **A (English Language, Communication, Critical Thinking)**
  - A-1 Oral Communication
  - A-2 English Writing
  - A-3 Critical Thinking

- **B (Mathematics, Sciences & Technology)**
  - B-1 Physical Sciences
  - B-2 Life Sciences – Biology
  - B-3 Mathematics – Mathematics and Applications
  - B-4 Computers and Information Technology

- **C (Fine Arts, Literature, Languages & Cultures)**
  - C-1 Art
  - C-2 Literature Courses
  - C-3a Language
  - C-3b Multicultural

- **D (Social Perspectives)**

- **E (Human Psychological and Physiological Perspectives)**

- **UDIGE/INTD Interdisciplinary**

Meets University Writing Requirement (Graduation Writing Assessment Requirement)  
Meets University Language Requirement

**American Institutions, Title V Section 40404:** Government  
US Constitution  
US History
Regarding Exec Order 405, for more information: [http://senate.csuci.edu/comm/curriculum/resources.htm](http://senate.csuci.edu/comm/curriculum/resources.htm)
**Service Learning Course** (Approval from the Center for Community Engagement must be received before you can request this course attribute).

**Online Course** (Answer YES if the course is ALWAYS delivered online).

5. **Justification and Requirements for the Course.** [Make a brief statement to justify the need for the course]

   - OLD
   - Requirement for the Major/Minor
   - Elective for the Major/Minor
   - X Free Elective
   - NEW
   - Requirement for the Major/Minor
   - Elective for the Major/Minor
   - X Free Elective

Submit Program Modification if this course changes your program.

6. **Student Learning Outcomes.** (List in numerical order. Please refer to the Curriculum Committee's “Learning Outcomes” guideline for measurable outcomes that reflect elements of Bloom's Taxonomy: [http://senate.csuci.edu/comm/curriculum/resources.htm](http://senate.csuci.edu/comm/curriculum/resources.htm). The committee recommends 4 to 8 student learning outcomes, unless governed by an external agency (e.g., Nursing).

   Upon completion of the course, the student will be able to:

   - OLD
   - Through this course, students will be able to
   - • explain the basic concepts and physical principles of astronomy
   - • describe the astronomical properties of the planets in our solar system
   - • demonstrate the usefulness and accuracy of astronomical predictions
   - • search and retrieve practical information
   - • use a variety of programs to simulate astronomical phenomena
   - • organize and express ideas clearly and convincingly in oral and written forms.

   - NEW
   - Through this course, students will be able to
   - • explain the basic concepts and physical principles of astronomy
   - • describe the astronomical properties of the planets in our solar system
   - • demonstrate the usefulness and accuracy of astronomical predictions
   - • search and retrieve practical information
   - • use a variety of programs to simulate astronomical phenomena
   - • Write effectively in various forms. (GE 4.2)
   - • Make connections between important/core/key concepts (or big ideas) in the natural sciences to describe/explain natural phenomena. (GE 5.4)

7. **Course Content in Outline Form.** (Be as brief as possible, but use as much space as necessary)

   - OLD
   - Introduction to Astronomy, time and spatial scales, scientific notation, survey of planets.
   - Motions in the sky. Phases of the moon. Eclipses.
   - History of Astronomy.
   - Gravity and orbits. Light and telescopes. Information from distant objects.
   - Origin of the Solar System.
   - The Sun. Inner planets: Mercury, Venus, the Earth and Mars.
   - Outer planets: Jupiter, Saturn, Uranus, Neptune and Pluto.
   - Meteorites, Asteroids and Comets.
   - Life, evolution and death of stars. Supernovae and black holes.
   - Origins of life in the Universe.

   - NEW
   - Introduction to Astronomy, time and spatial scales, scientific notation, survey of planets.
   - Motions in the sky. Phases of the moon. Eclipses.
   - History of Astronomy.
   - Gravity and orbits. Light and telescopes.
   - Origin of the Solar System.
   - The Sun. Inner planets: Mercury, Venus, the Earth and Mars.
   - Outer planets: Jupiter, Saturn, Uranus, Neptune and Pluto.
   - Meteorites, Asteroids and Comets.
   - Evolution of life and exobiology.
   - Greenhouse effect.
   - Origins of life in the Universe.

   Does this course content overlap with a course offered in your academic program?  **Yes**  **No**

   If YES, what course(s) and provide a justification of the overlap.

   Does this course content overlap a course offered in another academic area?  **Yes**  **No**

   If YES, what course(s) and provide a justification of the overlap.

   Overlapping courses require Chairs' signatures.
8. Cross-listed Courses (Please note each prefix in item No. 1)
   A. List cross-listed courses (Signature of Academic Chair(s) of the other academic area(s) is required).
   B. List each cross-listed prefix for the course: PHYS and ASTR
   C. Program responsible for staffing: Math and Physics

9. References. [Provide 3-5 references]
   OLD
   • Worlds Apart: A Textbook in Planetary Sciences
   NEW
   • How I Killed Pluto and Why It Had It Coming, by Mike Brown (Spiegel & Grau, 2012, ISBN 978-0385531108)
   • The Essential Cosmic Perspective, by Jeffrey Bennett et al. (Addison-Wesley, 6th Ed. 2010, ISBN 978-0321718235)
   • Storms of My Grandchildren: The Truth About the Coming Climate Catastrophe and Our Last Chance to Save Humanity, by James Hansen (Bloomsbury, 2010, ISBN 978-1608195022 [paperback]

10. Tenure Track Faculty qualified to teach this course.
   Dr. Geoff Dougherty
   Dr. Gregory Wood

11. Requested Effective Date or First Semester offered: Fall 2013

12. New Resource Requested: Yes ☐ No X
    If YES, list the resources needed.
    A. Computer Needs (data processing, audio visual, broadcasting, other equipment, etc.) ☒
    B. Library Needs (streaming media, video hosting, databases, exhibit space, etc.) ☒
    C. Facility/Space/Transportation Needs: ☒
    D. Lab Fee Requested: Yes ☒ No ☐ (Refer to the Dean’s Office for additional processing)
    E. Other. ☐

13. Will this course modification alter any degree, credential, certificate, or minor in your program? Yes ☐ No X
    If, YES attach a program update or program modification form for all programs affected.
    Priority deadline for New Minors and Programs: October 1, 2013 of preceding year.
    Priority deadline for Course Proposals and Modifications: October 15, 2013.
    Last day to submit forms to be considered during the current academic year: April 15th.

Brian K. Rasnow and Gregory G. Wood 2/4/2013
Type in name. Signatures will be collected after Curriculum approval.
GE Committee response to your request have PHYS105: Introduction to the Solar System added to B1: Physical Sciences -- Chemistry, Physics, Geology, and Earth Sciences

Approved by 2013-2014 Committee:
Janet Rizzoli
Emily Saunders
Geoffrey Buhl
Catherine Burriss
Jose Alamillo
Kathy Musashi
Debra Hoffmann
Rachel Danielson
Dax Jacobson
Sarah Johnson

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Request Submitted
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Course: PHYS105 Introduction to the Solar System
Area: B1 Physical Sciences -- Chemistry, Physics, Geology, and Earth Sciences
Date Submitted: 4/11/2013 6:09:52 PM
Date Approved: 10/21/2013 2:19:56 PM

1. Promote the understanding and appreciation of the methodologies of math or science as investigative tools and the limitations of mathematical or scientific endeavors

Astronomy is an excellent area for discussing methodologies since over history there have been a huge array of tools (both mathematical and physical, such as telescopes) used to understand parts of the solar system. It is also a great place to discuss the limitations of current understanding since it is easy to ask a question we do not know the answer to, such as: what are those planets and what are they made of? is there life elsewhere in the solar system? These are questions we are getting better answers to right now - and so new information is coming all the time.

2. Present mathematical or scientific knowledge in a historical perspective and the influences of math or science on the development of world civilizations, both past and present

As a sub-field of physics, astronomy is the best in terms of (1) having a long historical development and (2) having very extensive historical evidence from many different world civilizations. For example, there are lunar and solar calendars used by different cultures (both now and in the past) and both have some nice properties - which can be understood through the motion of the Earth and Moon. Many misconceptions are addressed in astronomy, from: if the Earth is moving, why don't we feel it? if the Earth is curved, do we see that? The greenhouse effect is in the curriculum. This is necessary to account for the temperatures of the various planets. Considering the news about global warming, the surface temperatures of various planets, which at first glance seems of limited academic interest, can become important.

3. Apply inductive and deductive reasoning processes and explore fallacies and misconceptions in the mathematical or scientific areas

Most physics looks very deductive: we use formula to calculate something which we can measure. We do this in astronomy with the motion of planets and phases of the moon. Yet all these formula were formed via piles of experimental data - a process which looks more like induction. In astronomy, both are explored.

4. Present the principles and concepts of the physical sciences and the physical universe

Many central physics concepts like force, acceleration, temperature, and energy are developed in astronomy.
## Approval Sheet

**Course:** PHYS 105  
If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

The CI program review process includes a report from the respective department/program on its progress toward accessibility requirement compliance. By signing below, I acknowledge the importance of incorporating accessibility in course design.

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