

# 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**

DATE (CHANGE DATE EACH TIME REVISED): 2/4/2013; REV 10.21.13GE; REV 11.12.13; REV 12.17.13BR; REV 1.16.14

PROGRAM AREA(S): PHYS/ASTRONOMY

**Directions:** All of 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.]

|                                                                 |                                                         |
|-----------------------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> Course title                           | <input type="checkbox"/> Course Content                 |
| <input type="checkbox"/> Prefix/suffix                          | <input type="checkbox"/> Course Learning Outcomes       |
| <input type="checkbox"/> Course number                          | <input checked="" type="checkbox"/> References          |
| <input checked="" type="checkbox"/> Units                       | <input type="checkbox"/> GE                             |
| <input type="checkbox"/> Staffing formula and enrollment limits | <input type="checkbox"/> Other <input type="checkbox"/> |
| <input type="checkbox"/> Prerequisites/Corequisites             | <input type="checkbox"/> Reactivate Course              |
| <input checked="" type="checkbox"/> Catalog description         |                                                         |
| <input checked="" type="checkbox"/> 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 i f 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: ☐

**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.

**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.

General Education Categories: B1

General Education Categories: B1

Grading Scheme (Select one below):

☒ 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:

Grading Scheme (Select one below):

☒ 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:

☒ Undergraduate

X Undergraduate  
 Post-Baccalaureate  
 Graduate

Post-Baccalaureate  
 Graduate

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

Hegis Code(s) \_\_\_\_\_  
 (Provided by the Dean)

#### Existing

#### Proposed

|               | Units | Hours Per Unit | Benchmark Enrollment | Graded |               | Units | Hours Per Unit | Benchmark Enrollment | Graded | CS No. (filled out by Dean) |
|---------------|-------|----------------|----------------------|--------|---------------|-------|----------------|----------------------|--------|-----------------------------|
| Lecture       | 3     | 1              | 40                   | x      | Lecture       | 3     | 1              | 40                   | x      |                             |
| Seminar       |       | 1              |                      |        | Seminar       |       | 1              |                      |        |                             |
| Lab           |       | 3              |                      |        | Lab           |       | 3              |                      |        |                             |
| Activity      | 1     | 2              |                      | x      | Activity      |       | 2              |                      |        |                             |
| Field Studies |       |                |                      |        | Field Studies |       |                |                      |        |                             |
| Indep Study   |       |                |                      |        | Indep Study   |       |                |                      |        |                             |
| Other blank   |       |                |                      |        | Other blank   |       |                |                      |        |                             |
| Online        |       |                |                      |        | Online        |       |                |                      |        |                             |

### 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>  
 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)**

- X 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>

☐ **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>. 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.

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

**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.  
Night sky. Celestial Sphere. Seasons.  
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.  
Astronomy beyond the Solar System. Conclusions.

**NEW**

Introduction to Astronomy, time and spatial scales, scientific notation, survey of planets.  
Night sky. Celestial Sphere. Seasons.  
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 X

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 X

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

Seeds, Foundations of Astronomy (Brooks/Cole Pub Co; ; 7th edition, January 2003: ISBN: 0534392040)

• Worlds Apart: A Textbook in Planetary Sciences

by Guy J. Consolmagno, Martha Schaefer (Contributor) (Prentice Hall; ; 1994: ISBN: 0139641319)

• J.K. Beatty et al.: The New Solar System. (Cambridge Univ ; 4th edition,1998): ISBN: 0521645875

• Paul G. Hewitt, Conceptual Physics, 9<sup>th</sup> edition, Addison Wesley Publishing, 2001)).

NEW

- How I Killed Pluto and Why It Had It Coming, by Mike Brown (Spiegel & Grau, 2012, ISBN 978-0385531108)
- The Pluto Files: The Rise and Fall of America's Favorite Planet, by Neil deGrasse Tyson (W.W.Norton, 2009, ISBN 978-0393337327)
- The Essential Cosmic Perspective, by Jeffrey Bennett et al. (Addison-Wesley, 6<sup>th</sup> Ed. 2010, ISBN 978-0321718235)
- The New Solar System, by J.K. Beatty et al. (Cambridge Univ ; 4th edition,1998): ISBN: 0521645875
- Lecture Tutorials for Introductory Astronomy, by Edward Prather et al. (Addison-Wesley,3rd Ed., 2012, ISBN 978-0321820464) [Paperback]
- 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 ☒**

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 ☒**

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 15<sup>th</sup>.**

Brian K. Rasnow and Gregory G. Wood

**2/4/2013**

Proposer(s) of Course Modification

Date

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 formulae 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 formulae 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.

|               |  |  |
|---------------|--|--|
| Program Chair |  |  |
|---------------|--|--|

Signature

Date

|               |  |  |
|---------------|--|--|
| Program Chair |  |  |
|---------------|--|--|

Signature

Date

|               |  |  |
|---------------|--|--|
| Program Chair |  |  |
|---------------|--|--|

Signature

Date

|                         |  |  |
|-------------------------|--|--|
| General Education Chair |  |  |
|-------------------------|--|--|

Signature

Date

|                                  |  |  |
|----------------------------------|--|--|
| Center for Intl Affairs Director |  |  |
|----------------------------------|--|--|

Signature

Date

|                                         |  |  |
|-----------------------------------------|--|--|
| Center for Integrative Studies Director |  |  |
|-----------------------------------------|--|--|

Signature

Date

|                                              |  |  |
|----------------------------------------------|--|--|
| Center for Multicultural Engagement Director |  |  |
|----------------------------------------------|--|--|

Signature

Date

|                                                           |  |  |
|-----------------------------------------------------------|--|--|
| Center for Civic Engagement and Service Learning Director |  |  |
|-----------------------------------------------------------|--|--|

Signature

Date

|                  |  |  |
|------------------|--|--|
| Curriculum Chair |  |  |
|------------------|--|--|

Signature

Date

|     |  |  |
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| AVP |  |  |
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Signature

Date