UC 12365 13F
(Revised)

# CBM003 ADD/CHANGE FORM

| ☒ Undergraduate Council | or | Graduate/Professional Studies Council |
|---|---|---|
| ☐ New Course ☒ Course Change | | ☐ New Course ☐ Course Change |
| Core Category: Life/Phys Sci Effective Fall 2014 | | Effective Fall 2013 |

1. Department: Physics College: NSM

2. Faculty Contact Person: Donna Stokes Telephone: 3-3588 Email: dstokes@uh.edu

Approved 10/2/13

3. Course Information on New/Revised course:
   - Instructional Area / Course Number / Long Course Title:
     PHYS / 1306 / Introductory Astronomy - Stellar and Galactic Systems
   - Instructional Area / Course Number / Short Course Title (30 characters max.)
     PHYS / 1306 / INTRO ASTRONOMY - STELLA AND G
   - SCH: 3.00 Level: FR CIP Code: 40.0801.00 Lect Hrs: 3 Lab Hrs: 0

4. Justification for adding/changing course: **To meet core curriculum requirements**

5. Was the proposed/revised course previously offered as a special topics course? ☐ Yes ☒ No
   If Yes, please complete:
   - Instructional Area / Course Number / Long Course Title:
     ____ / ____ / _____
   - Course ID: _____ Effective Date (currently active row): _____

6. Authorized Degree Program(s): BA/BS
   - Does this course affect major/minor requirements in the College/Department? ☐ Yes ☒ No
   - Does this course affect major/minor requirements in other Colleges/Departments? ☐ Yes ☒ No
   - Can the course be repeated for credit? ☐ Yes ☒ No (if yes, include in course description)

7. Grade Option: Letter (A, B, C ...) Instruction Type: lecture ONLY (Note: Lect/Lab info. must match item 3, above.)

8. If this form involves a change to an existing course, please obtain the following information from the course inventory: Instructional Area / Course Number / Long Course Title
   PHYS / 1306 / Introductory Astronomy - Stellar and Galactic Systems
   - Course ID: 039075 Effective Date (currently active row): 8262013

9. Proposed Catalog Description: (If there are no prerequisites, type in "none".)
   Cr: 3. (3-0). Prerequisites: credit for or concurrent enrollment in MATH 1310 or 1311. Description (30 words max.): Introduction to optics, atomic physics, nuclear physics, and current astrophysical measurement techniques; stellar structure and evolution; galactic structure and evolution; cosmology. May not apply to course or GPA requirements for a major or minor in natural sciences and mathematics.

10. Dean's Signature: _____ Date: 7 Oct '13
    Print/Type Name: _____

# REQUEST FOR COURSES IN THE CORE CURRICULUM

Originating Department or College: Physics/NSM

Person Making Request: Donna Stokes Telephone: 713-743-3588

Email: dstokes@uh.edu

Dean's Signature: _____ Date: Click here to enter text.

Course Number and Title: Phys 1306 Introductory Astronomy – Stellar and Galactic Systems

Please attach in separate documents:

X Completed CBM003 Add/Change Form with Catalog Description

X Syllabus

List the student learning outcomes for the course (Statements of what students will know and be able to do as a result of taking this course. See appended hints for constructing these statements):

Upon completion of this course, students will be able to understand (1) the techniques used to make astronomical observations, (2) the history of the evolution of physics and astronomy to its present state, (3) the structure of the Sun and the processes by which energy is liberated, (4) The evolution of stars in general, (5) the final states that stars can evolve into, (6) the fundamental tenents of Quantum Mechanics, (7) the basic ideas of the theories of special and general relativity, (8) the structure and evolution of galaxies, (9) the Big Bang Theory, and (10) our current theories regarding the possibility of other intelligent species and civilizations on other worlds.

Component Area for which the course is being proposed (check one):

***Note:** If you check the Component Area Option, you would need to also check a Foundational Component Area.

Communication

☐ Mathematics

☐ Language, Philosophy, & Culture

☐ Creative Arts

X Life & Physical Sciences

☐ American History

☐ Government/Political Science

☐ Social & Behavioral Science

☐ Component Area Option

Competency areas addressed by the course (refer to appended chart for competencies that are required and optional in each component area):

| | |
|---|---|
| X Critical Thinking | X Teamwork |
| X Communication Skills | ☐ Social Responsibility |
| X Empirical & Quantitative Skills | ☐ Personal Responsibility |

Because we will be assessing student learning outcomes across multiple core courses, assessments assigned in your course must include assessments of the core competencies. For each competency checked above, indicated the specific course assignment(s) which, when completed by students, will provide evidence of the competency. Provide detailed information, such as copies of the paper or project assignment, copies of individual test items, etc. A single assignment may be used to provide data for multiple competencies.

Critical Thinking:
Homework and exams will challenge the students to understand the mechanisms,concepts, and dilemmas facing many of the current theories.

Communication Skills:
The class will be broken into "Call Groups" of 4-8 students (depending upon class size). The syllabus will indicate which class meetings each individual call group will be responsible for. At the beginning of each class, one to two members from the call groups (selected randomly by the instructor, will orally review a designated topic for the class. The call groups must turn in a written summary of the material presented in the class. The written summary will be used or assessment.

Empirical & Quantitative Skills:
The course requires College Algebra as a pre- or co-requisite. Homework and the exams include quantative reasoning questions. The course is based on a "How do we know that" approach.

Teamwork:
The class will be broken into "Call Groups" of 4-8 students (depending upon class size). The syllabus will indicate which class meetings each individual call group will be responsible for. At the beginning of each class, one to two members from the call groups (selected randomly by the instructor, will orally review a designated topic for the class. The call groups must turn in a written summary of the material presented in the class. The written summary will be used or assessment.

Social Responsibility:
Click here to enter text.

Personal Responsibility:
Click here to enter text.

Will the syllabus vary across multiple section of the course? ☐ Yes X No
If yes, list the assignments that will be constant across sections:
There is typically only one section offered in any given semester.

Inclusion in the core is contingent upon the course being offered and taught at least once every other academic year. Courses will be reviewed for renewal every 5 years.

The department understands that instructors will be expected to provide student work and to participate in university-wide assessments of student work. This could include, but may not be limited to, designing instruments such as rubrics, and scoring work by students in this or other courses. In addition, instructors of core courses may be asked to include brief assessment activities in their course.

Dept. Signature: _____

# UNIVERSITY of HOUSTON

COLLEGE OF NATURAL SCIENCES & MATHEMATICS HTTP://NSM.UH.EDU

**COURSE TITLE/SECTION:** Physics 1306 Stellar and Galactic Astronomy/Class Number #####

**TIME:** Time and Days **LOCATION:** Building and room #

**FACULTY:** Instructor name **OFFICE HOURS:** Time and days and by appointment
Building and room # M412, SERI

**E-mail:** pinsky@uh.edu **Phone: (713) 743-** 3552 **FAX: (713) 743-3589**

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## I. Course: Physics 1306 - Stellar and Gallactic Astronomy

A. **Catalog Description:** Introduction to optics, atomic physics, nuclear physics, and current astrophysical measurement techniques; stellar structure and evolution; galactic structure and evolution; cosmology.

**Note: May not apply to course or GPA requirements for a major or minor in natural sciences and mathematics.**

B. **Prerequisites**: credit for or concurrent enrollment in MATH 1310 or MATH 1311.

## II. Course Learning Objectives:

The objective of this course is Learn the principles of mechanics through application of Newton's laws a.

Upon completion of this course, students will be able to understand

(1) the techniques used to make astronomical observations,
(2) the history of the evolution of physics and astronomy to its present state,
(3) the structure of the Sun and the processes by which energy is liberated,
(4) The evolution of stars in general,
(5) the final states that stars can evolve into,
(6) the fundamental tenents of Quantum Mechanics,
(7) the basic ideas of the theories of special and general relativity,
(8) the structure and evolution of galaxies,
(9) the Big Bang Theory, and
(10) Our current theories regarding the possibility of other intelligent species and civilizations on other worlds.

III. **Course Content:** This course will cover chapter 1 – 28 which include the following topical areas:

1. Introduction to early astronomers
2. Electromagnetism, radiation and spectra
3. The stars: observable properties
4. The sun: A typical Star
5. Stellar Evolution
6. Our Galaxy, The Milky Way
7. Other Galaxies
8. Cosmology
9. Life in the universe

IV. **Course Structure:**
The web address for the class is www.yourclasswebaddress.

V. **Textbooks**
***Astronomy Today, by Chaisson and McMillan 7th Edition***.

VI. **Course Outline: See lecture schedule at end of syllabus**

A. **Homework Assignments**: There will be a sequence of approximately 10 Homework assignments that will count in total as the equivalent of one additional 1-hour Exam. The Homework Assignments will be completed via the Web using the University's BLACKBOARD facilities. All students officially registered for the course automatically have access to these assignments. Go to the help desk in the basement of the library to get your BLACKBOARD UserID and password.

B. **Exams:** There will be three 1-hour Exams and the Final Exam indicated on the syllabus, Make up exams are all ORAL and may be taken during normal office hours or by appointment. All exams are closed book and no notes are allowed. There also may be Pop Quizzes given in class during any scheduled class period. Pop Quizzes may not be dropped, made up or excused for any reason except where the student is required to formally represent the University in some official University activity. **Missing Pop Quizzes may be hazardous to your final course grade!**

C. **Teamwork Component:** There will be a **teamwork** component that will have the weight of a Pop Quiz (≥ 5%).The students in the class will be assigned to "call-groups" of from 4-8 members each. Each call group will be assigned to a number of specific class meetings that they are responsible for. The group is expected to arrange to meet, either in person or via the chat-room facility of Blackboard and

# Sample Homework/Exam Questions

1. On an HR diagram:

   a. ...cooler stars are always plotted towards the right on the diagram with respect to hotter stars.
   b. ...Two stars with the same absolute magnitude are plotted at the same level on the vertical axis.
   c. ...the vertical axis can be plotted as color.
   d. ...the horizontal axis can be plotted in spectral types.
   e. ...any star that is generally above and to the right of another star must *always* be the smaller of the two stars.

2. Concerning stellar evolution:

   a. All stars less massive than the Sun generally take longer than the Sun did to reach the ZAMS from when they first started to contract.
   b. T-Tauri variables are generally thought to be examples of Pre-Main Sequence phenomena.
   c. all hydrogen "burning" concludes *in the central-most core* in the star's interior once a star leaves the main sequence.
   d. all *Cephied* variable stars are in a Pre-Main Sequence phase.
   e. stars are always hotter at their surface when they first leave the main sequence than when they "Helium Flash."

3. Neutron stars:

   a. ...do not collapse further because neutrons are fermions and they can become degenerate.
   b. ...are typically only about 2,000 miles across (~the size of the Moon).
   c. are thought to be the explanation for pulsars in many cases.
   d. ...are all thought to be remnants of prior Type 1A supernovae.
   e. ...all necessarily must have had luminosities greater than the Sun's when they were main sequence stars.

4. Concerning the Solar Neutrino Experiment that was done in the South Dakota mine, which of the following are true:

   a. The detector contained common dry-cleaning fluid as a detector of neutrinos.
   b. It required a deep mine so that no radioactive materials from the surface of the Earth would contaminate the detrector.
   c. It found too few neutrinos (~1/3) when compared with theoretical predictions.
   d. detected neutrinos by looking for $^{37}Ar$ produced as a result of neutrino interactions.
   e. it attempted to "detect" neutrinos coming directly from the center of the Sun.

draft a written comprehensive review summary of the contents of the immediately prior classes lecture. At the beginning of the class period for which the call group has been assigned, the instructor will choose one or more members of the call group to review for the entire class orally in no more than 5 minutes a specified aspect of the content of the prior class. The instructor will assign a grade to each of the students in the call group of from 0-5 points for the quality of the oral reviews presented, and a second grade of from 0 to 5 points for the quality of the written review. Those reviews deemed acceptable will be posted on Blackboard for the use of the entire class. Note, therefore that it is the responsibility of the entire membership of each call-group to insure that all of its members are prepared to give the oral review. The call group members that are chosen to make an oral presentation my use the review summary written by their call-group as a guide during the presentation.

## VII. Evaluation and Grading

**5% Team Work Assignment**
**20% Homework**
**10% Pop Quizzes**
**15% Regular Exam I**
**15% Regular Exam II**
**15% Regular Exam III**
**20% Final Exam (Day, time, location)**

**Policy on grades of I (Incomplete)**: The grade of "I" (Incomplete) is a conditional and temporary grade given when a student, for reasons beyond his or her control, has not completed a relatively small portion of all requirements. Sufficiently serious, documented situations include illness, death in the family, etc.

## VIII. Consultation

My office is located in room ### of Science and Research #1. My mailbox is located in the Physic office, room 617 in Science and Research # 1. My office hours will be from day and times. If you can not see me during those times, you may schedule an appointment with me by calling me at (713) 743-### or e-mailing me at e-mail@uh.edu.

## IX. Bibliography

References: EXPLORATION OF THE UNIVERSE (7th Ed.) Abell, Morrison, Wolff & Fraknoi (AMW&F) and FOUNDATIONS OF ASTRONOMY (2009 Ed.) Seeds

**Addendum:** Whenever possible, and in accordance with 504/ADA guidelines, the University of Houston will attempt to provide reasonable academic accommodations to students who request and require them. Please call 713-743-5400 for more assistance.

**Academic Honesty:** It is each student's responsibility to read and understand the Academic Honesty Policy found at http://www.uh.edu/academics/catalog/policies/academ-reg/academic-honesty/

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**Religious Holy Days:** Students whose religious beliefs prohibit class attendance or the completion of specific assignments on designated dates may obtain an excused absence. To do so, please make a written request for an excused absence and submit it to your instructor as soon as possible, to allow the instructor to make arrangements. For more information, see the Student Handbook.
http://www.uh.edu/academics/catalog/policies/academ-reg/religious-holy-days/index.php .

**Standard Disclaimer:** This syllabus is subject to change at the discretion of the instructor.

## Lecture Schedule - Spring 2013

| Date | Chapter | Notes |
|---|---|---|
| 14-Jan-13 | 1 | |
| 16-Jan-13 | 1and 2 | |
| 18-Jan-13 | 2 | |
| 21-Jan-13 | MLK Holiday | |
| 23-Jan-13 | 4 | |
| 25-Jan-13 | 4 | |
| 28-Jan-13 | 4 | *HW1 Due* |
| 30-Jan-13 | 4 | ***Jan 30 - Last Day to Drop Without a W*** |
| 1-Feb-13 | 5 | |
| 4-Feb-13 | 5 | |
| 6-Feb-13 | 5 | |
| 8-Feb-13 | 3 | |
| 11-Feb-13 | 3 | |
| 13-Feb-13 | 17 | HW2 DUE |
| 15-Feb-13 | 17 | HW3 Due |
| 18-Feb-13 | Exam | **Exam I** |
| 20-Feb-13 | 16 | |
| 22-Feb-13 | 16 | |
| 25-Feb-13 | 16 | |
| 27-Feb-13 | 16 | |
| 1-Mar-13 | 16 | HW4 DUE |
| 4-Mar-13 | 19 | |
| 6-Mar-13 | 19 | |
| 8-Mar-13 | 20 | |

| | | |
|---|---|---|
| 11-15-Mar-13 | Holiday | |
| 18-Mar-13 | 20 | |
| 20-Mar-13 | 21 | |
| 22-Mar-13 | 21 | **HW5 DUE** |
| 25-Mar-13 | 22 | |
| 27-Mar-13 | 22 | ***Mar 27- Last Day to Drop with a W*** |
| 29-Mar-13 | 22 | **HW6 DUE** |
| 1-Apr-13 | Exam | Exam II |
| 3-Apr-13 | 18 | |
| 5-Apr-13 | 19 | |
| 8-Apr-13 | 23 | |
| 10-Apr-13 | 23 | HW7 DUE |
| 12-Apr-13 | 24 | |
| 15-Apr-13 | 25 | |
| 17-Apr-13 | 25 | HW8 DUE |
| 19-Apr-13 | 26 | |
| 22-Apr-13 | 27 | HW9 DUE |
| 24-Apr-13 | 27 | **HW10 DUE** |
| 26-Apr-13 | 28 | **Exam III** |
| 29-Apr-13 | No Class | |
| 6-May-13 | **Final Exam** | **Final Exam, 11 am** |