University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course

1. Type of Action
   - A. Addition  ☒ Regular or ☐ Experimental or ☐ Other (click and type to specify)
   - ☐ B. Deletion
   - ☐ C. Modification: ☐ in credits ☐ in title ☐ in number or alpha (click to specify)

2. New Alpha, Number and Title
   - ASTR 181: Stellar Astronomy

3. Credits
   - 3 credits

4. Old Alpha, Number and Title
   - ☐

5. Credits *
   - ☐

6. New Catalog Description
   - A survey of modern stellar, galactic, and extragalactic astronomy, with emphasis on the underlying physical principles. Topics covered include stellar structure, interstellar environments and the formation of stars, stellar evolution and death, the structures of galaxies, and cosmology. Intended for science majors and prospective science teachers. The student should have a good operational familiarity with high school algebra.

7. Select box and type specific information in text box.
   - ☐ Prerequisites ☐ Corequisites or
   - ☒ Recommended Preparation
     The student should have a good operational familiarity with high school algebra; credit in ASTR 110 and/or
     ASTR 180.

8. Student Contact Hours Per Week
   - Lecture 3
   - Lecture/Lab
   - Lab
   - Other (click to specify)

9. Proposed Date of First Offering
   - Semester Spring
   - Year 2010

10. This course ☒ is proposed for the Liberal Arts Program Program. ☐ can fulfill Nat Sci: Physical If
     Other, specify

11. This course Makes No Difference in the number of credits required for the program/core.

12. Equivalent or similar courses offered in the UH System:

<table>
<thead>
<tr>
<th>Campus</th>
<th>Alpha, Number, Title</th>
<th>Campus</th>
<th>Alpha, Number, Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>ASTR 181: Principles of Astronomy II</td>
<td>*</td>
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<tr>
<td>UH Manoa</td>
<td>ASTR 280: Evolution of the Universe</td>
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</tbody>
</table>

13. This course is (check one and click in appropriate textbox and provide details):
   - ☐ Already articulated with
   - ☒ Appropriate for Articulation with ASTR 181 and ASTR 280
     Provide details of existing or desired articulation (date, college(s), purposes, pre-major, etc.) in this space:

14. Reason for Initiating, Modifying or Deleting Courses or Other Pertinent Comment:
   - Supports WCSC Strategic Plan Action Outcome 4.1, which states: "Contribute to the development of a high-skilled, high-wage workforce through the establishment of at least one new specific, career-focused degree, certificate or career pathway per year that leads to employment in emerging fields, including astronomy and space science." This new course will also form basis for developing a 2+2 articulation with UH-Hilo's BS in astronomy and a future certificate in Astronomy and Space Exploration at WCC. As such, it further supports Action Outcome 4.8: "Increase the number of degrees and certificates awarded in Science, Technology, Engineering, and Math (STEM) fields. (includes both credit and non-credit) by 3% per year.

Requested by: [Signature] 11/18/08
Department Chairperson

Approved by: [Signature] 01/18/09
Curriculum Committee Chairperson

Date 01/21/09

CCCM #6100 (Amended for WCC use October 2002)
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course

Faculty Senate Chairperson

Dean of Instruction

Provost

Date

Date

Date

CCCM #6100 (Amended for WCC use October 2002)
Levels of Review of Course Proposal at Windward Community College

Course Alpha, Number, and Title: ASTR 181: Stellar Astronomy

<table>
<thead>
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<th>Signatures</th>
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</tbody>
</table>

2. Department

Department Chairperson

Was this course discussed in a department meeting? Yes ☑ No ☐

3. Division


4. Curriculum Committee Review

Approved ☑

Disapproved ☐

Reason:

Curriculum Committee Chairperson

01/12/09
1. How is this course related to the education needs and goals of the College/Department/Community as reflected in the EDP/ADP?

This course supports WCC Strategic Plan Action Outcome 4.1, which states: "Contribute to the development of a high-skilled, high-wage workforce through the establishment of at least one new specific, career-focused degree, certificate or career pathway per year that leads to employment in emerging fields, [including astronomy and space science]. It also aligns with WCC Strategic Plan Action Outcome 4.5, "Promote the knowledge, skills, and opportunities that support current and emerging STEM fields and careers by increasing credit and non-credit STEM course enrollments by 3% per year."

2. Provide details of any additional staff, equipment, facilities, library/media material, faculty preparation and other financial support that would be required to implement this course. (Include an estimate of the actual cost of supplies and equipment.) What has been done to provide for these additional costs for the proposed date of offering? Who will teach the course?

Existing library/media material will be used to support this course. No additional expenses are anticipated. This course to be taught by Joseph Ciotti or a lecturer.

3. Is a similar course taught elsewhere in the UH system? * If yes, provide details of how this course differs from existing similar courses.

Yes. Exact same course (ASTR 181) is offered at UH Hilo. Also offered at UH Manoa as ASTR 280

4. Is this course experimental and/or unique to Windward Community College? No If yes, provide rationale and details of its impact on the College Curriculum

5. Is a similar course taught in the upper division level by a 4-year UH college? No If yes, explain why this course is appropriate at the lower division or how it differs from its upper division counterpart.

6. Please attach a complete course outline. Your course outline should address all the items listed in the Guidelines for Course Outlines.

7. If this course is numbered 100 or above or appropriate for transfer to a 4-year college, complete and attach WCC Form for Transfer Courses (blue). See criteria for transfer courses.
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
Course Modification Form – Go to next page for Articulation Form

WCC Form for Course Modifications

Course
Submitted by
Date November 17, 2008

1. What change is proposed in the course? Provide specific information comparing both the "new" and "old" course.

2. What is the rationale for the change?

3. Is the change substantive enough to require a change in course identification? If so, explain thoroughly.

4. Is the course articulated with any 4-year program? *

   If yes, give details of the agreement(s) and explain any impact the proposed modifications may have on articulation.

5. Provide details of any additional staff, equipment, facilities, library/media material, faculty preparation and other financial considerations that would be required to implement this course modification. What has been done to provide for these additional costs? Who will teach the course? Is additional preparation needed?

6. Will this course modification result in any alterations in the number of hours required to attain a certificate or degree? * If yes, provide details and justification for these alterations.

7. If the course is renumbered to 100 or above, does it meet the criteria for transfer level courses? (Go to next page for transfer course criteria.) *
WCC Form for Transfer Courses
(To be completed for articulation with any 4-year UH campus)
(This sheet was originally blue.)

Course Alpha and Number ASTR 180

Submitted by Joseph Ciotti

Date November 17, 2008

1. List the counterpart to this course on any 4-year UH campus. Describe the relationship between the course any related baccalaureate program area.

   UH Hilo: ASTR 180 (intended for science majors, including BS astronomy, and science teachers)

2. Is this course taught or accepted by major accredited colleges or universities? Give one or two examples.

   University of California, Santa Cruz (ASTR C10 Introduction to General Astronomy); University of Michigan (ASTR 160: Introduction to Astrophysics)

3. Please attach a complete course outline if you have not done so already. Your course outline should address all the items listed in the Guidelines for Course Outlines.
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
Articulation with 4-year UH Campus Form

COURSE ARTICULATION FORM (GENERAL EDUCATION CORE)

ORIGINATING CAMPUS: Windward Community College DATE SUBMITTED: November 17, 2008

COURSE ALPHA & NUMBER: ASTR 181 SEMESTER CREDITS: 3

COURSE TITLE: Stellar Astronomy

DATE OF OUTLINE: November 17, 2008 Year 2010

(** Representative outline, no multiple syllabi, please.)

1. Articulation committee to review this course:

   Standing Committees
   
   Written Communication
   Mathematical & Logical Thinking
   World Civilizations
   Languages
   Arts & Humanities
   Natural Science
   Social Science

2. The information in this item is required by the reviewing committee so that it has a starting point for reviewing the course. It is the responsibility of the submitting campus to do the necessary research to provide this information.

In the opinion of the originating campus, this course is equivalent to the following and/or meets the criteria for the indicated core categories. Every core category space, except your own campus, must be filled in (can include 'none'). An equivalent course, if known, may be helpful to committee members but is not required.

<table>
<thead>
<tr>
<th>Receiving Campus</th>
<th>Equivalent Course (Alpha and Number)</th>
<th>Core Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>ASTR 181</td>
<td>BS in Astronomy</td>
</tr>
<tr>
<td>UH Manoa</td>
<td>ASTR 280</td>
<td>NI DP</td>
</tr>
<tr>
<td>UH West Oahu</td>
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<td>Hawaii CC</td>
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<tr>
<td>Windward CC</td>
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</tbody>
</table>

3. If submitted electronically, I understand that this outline will be posted to a publicly accessible web site to enable open access for reviewing committees and campuses. The outline will be taken off the site upon completion of the review.

Typed Name or Signature

Note: If possible submit coversheet and course outline electronically as e-mail attachments (preferably in ‘pdf’ format). If submitting in printed form, 20 copies of coversheet and course outline are required for distribution for appropriate review.

Note: UCA Clearinghouse
John Muth, Office of the Chancellor for Community Colleges, is acting as staff to the University Council on Articulation and is responsible for tracking all courses submitted for articulation.

Revised 1/29/2001
University of Hawaii Community Colleges  
Proposal to Initiate, Modify or Delete a Course  
Articulation with 4-year UH Campus Form  

COMMITTEE LEVEL:

1. When the committee has completed its review of a course, the “ARTICULATION RECOMMENDATION FORM” (revised 1/18/2001) should be filled in and attached to the outline. The committee chair should also sign the form.

2. If the committee choice is “accept,” indicate receiving campus core area. If the committee choice is “not recommended,” a reason must be provided. Outlines with missing or incomplete recommendation forms will be returned to the committee.

If a committee requires updated or more complete outlines, such requests should be made through the UCA Clearinghouse so that the new outline material can be tracked and placed in the file. If a committee requires more general supporting information, this should be requested through the course’s supporting campus representative on the committee.

3. All committee recommendations should be sent to the UCA Clearinghouse for recording and dissemination to the campuses. DO NOT SEND THE RECOMMENDATIONS DIRECTLY TO ANY CAMPUS.

RECEIVING CAMPUS:

1. Courses will be sent to each campus for consideration after they come out of committee. Each campus has its own internal process for the approval of courses for its general education core.

2. In all cases where a campus accepts a course into its general education core, it must also indicate which area or part of its core the course fits.

3. In all cases where a campus does not accept a course for articulation, it must supply a reason (even it is “we agree with the committee”).

4. When campus actions are completed, these actions should be conveyed back to the UCA Clearinghouse for recording and publication.

5. The Community College Policy on Acceptance of UCA Reviewed Courses is as follows:

   (a) All Community Colleges agree to accept positive UCA committee recommendations for core, including core categories assigned by the committee.

   (b) All Community Colleges agree to accept the UCA committee judgment of not-Recommended (nR) without further review.

   (c) This policy is retroactive to the time the current articulation effort started.

   (d) The Community Colleges reserve the right to review and modify core category assignments as necessary to insure appropriate categorization and to realign such assignments if changes are made to the campus core structure. Such modifications shall not interfere with the timely publication of the student transfer handbook.

Note: UCA Clearinghouse  
John Muth, Office of the Chancellor for Community Colleges, is acting as staff to the University Council on Articulation and is responsible for tracking all courses submitted for articulation.

Revised 1/29/2001
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
Articulation with 4-year UH Campus Form

ARTICULATEDCOURSE
CHANGE IN ALPHA/NUMBER/TITLE

Old Course

Course Alpha & Number:
Title:

Revised Course

Course Alpha & Number:
Title:
Semester and Year when the revised course was/will be first offered:
Reason for the change in Alpha/Number/and/or Title:

Note: A current outline of the course must be submitted with this form. Undated outlines are not acceptable.

I certify that this course has had its alpha, number, and/or title changed, but that it is substantially the same course as the course that was reviewed and approved for articulation.

Campus: Windward Community College
Certifying Authority (Typed Name or Signature and Title)
Date:

SUBMIT TO: UCA Clearinghouse, Attn: John Muth
Chancellor’s Office for CC, 2327 Dole Street

Revised 1/19/01
ASTR 181: Stellar Astronomy
3 credits
Tuesday & Thursday 8:15 – 9:30 am

INSTRUCTOR: Joseph Ciotti
OFFICE: ‘Imiloa 134
OFFICE HOURS: posted on office door
TELEPHONE: 236-9111
EMAIL: ciotti@hawaii.edu
EFFECTIVE DATE: Spring 2010

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

A survey of modern stellar, galactic, and extragalactic astronomy, with emphasis on the underlying physical principles. Topics covered include stellar structure, interstellar environments and the formation of stars, stellar evolution and death, the structures of galaxies, and cosmology. Intended for science majors and prospective science teachers. The student should have a good operational familiarity with high school algebra. If students desire to take ASTR 110, 180, and 181, they may receive credit for ASTR 110 only if it is taken prior to taking ASTR 180 and ASTR 181.

Recommendations: The student should have a good operational familiarity with high school algebra. It is further recommended that the student have credit in ASTR 110 and/or ASTR 180.

Activities Required at Scheduled Times Other Than Class Times: none

STUDENT LEARNING OUTCOMES

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

1. Outline the development of stellar astronomy from ancient times to present and explain the role of the scientific method in this historic context
2. Identify the appropriate instruments used by astronomers to understand the universe and describe the nature of electromagnetic radiation and its role in deciphering the mysteries of stellar astronomy.
3. Describe the physical and chemical nature of stars, and especially our sun, and apply the astronomical techniques used to measure stellar properties.
4. Outline the evolutionary stages in a star's life, including the role of the interstellar medium.
5. Compare and contrast the structure of our Milky Way and other galaxies.
6. Outline and appraise the leading cosmological theories of the origin of the universe.
7. Apply astronomical concepts to the search for extraterrestrial life.

COURSE OVERVIEW

A. Goals of the Course

The goals of the course are:

1. To provide the student with the fundamental knowledge and concepts of stellar and galactic systems.
2. To provide the student with the general methods and techniques used by astronomers to understand stellar and galactic systems.
3. To cultivate and enhance the student's ability to reason by applying the scientific method.
4. To promote greater student appreciation and awareness of stellar astronomy and its role in our society and world in general, especially as related to energy sources.

B. Expectations of Students

Success in this course will be enhanced by:

1. a positive, inquiring attitude toward science
2. setting aside adequate time for studying and working problems
3. reading the text carefully and making notes and use of handouts and other learning materials whenever necessary
4. seeking assistance from the instructor
5. class attendance and responsibly obtaining all assignments and/or changes to the course syllabus
6. keeping abreast with or ahead of the syllabus

C. Mode of Instruction

Lecture/Discussion: The initial portion of each lecture period is used to discuss and clarify any questions from the preceding class meeting. The remaining portion is used to present and discuss new materials. Demonstrations and audio-visual materials are included in lectures.

ASSESSMENT TASKS AND GRADING

Method of Evaluation

Evaluation of the successful completion of the objectives of this course will be determined by grades received on all tests.

There will be 4 QUIZZES (worth 50 points each), a MID-TERM EXAM (worth 100 points) and a FINAL EXAM (worth 100 points). All tests are to be taken within the classroom environment; all are closed-book/closed notes. The Mid-Term Exam includes all material covered prior to the exam date; the Final Exam includes all material covered after the Mid-Term Exam and a few important
concepts covered in the first half of the course.

All tests are principally objective-type tests with a few short essay-type questions. Tests dates are listed on the course syllabus.

Test dates are listed on the course syllabus. The student is responsible for keeping abreast with any changes in syllabus, which are announced in class. Unless permission is granted by the instructor, all tests must be completed and submitted to the instructor at the specified date and time.

**Grading System**

Each letter grade and its respective level of achievement is provided in the following table:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90% - 100% of cumulative points possible</td>
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<tr>
<td>B</td>
<td>80% - 89% of cumulative points possible</td>
</tr>
<tr>
<td>C</td>
<td>70% - 79% of cumulative points possible</td>
</tr>
<tr>
<td>D</td>
<td>60% - 69% of cumulative points possible</td>
</tr>
<tr>
<td>F</td>
<td>below 60% of cumulative points possible</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete: This is a temporary grade given at the instructor's option when a student has failed to complete a small part of a course because of circumstances beyond the student's control. The student is expected to complete the course by the designated deadline in the succeeding semester. If this is not done, the “I” will revert to the contingency grade identified by the instructor.</td>
</tr>
</tbody>
</table>

Credit/No Credit Option

*Note: Refer to the current Schedule of Classes for CR/NC declaration deadlines. This grading option is not available in all courses and will not be offered to majors in required courses.*

| CR | Achievement of objectives of course at the C level or higher. (course credit awarded) |
| NC | Used to denote achievement of objectives of the course at less than C level under CR/NC option. (no course credit awarded) |

| N  | The “N” grade, which is issued at the instructor’s option, indicates that the student has worked conscientiously, attended regularly, finished all work, fulfilled course responsibilities, and has made measurable progress. However, either the student has not achieved the minimal student learning objectives and is not yet prepared to succeed at the next level, or the student has made consistent progress in the class but is unable to complete the class due to extenuating circumstances, such as major health, personal or family emergencies, (no course credits awarded) |

| W  | Official withdrawal from the course. See the Schedule of Classes for information regarding current semester deadlines. If a student officially withdraws within the erace period, the record of registration will not appear on the student’s transcript. (no course credits awarded) |

| L  | Audited Course (no course credit awarded) |
LEARNING RESOURCES

*Universe: Stars and Galaxies*
Roger A. Freedman and William J. Kaufmann III

Additional Information

1. If a student is unable to take an exam at the scheduled time, the student is responsible for notifying the instructor of the situation and reason(s). The student is responsible for requesting a make-up exam. An appropriate scoring penalty may be assigned to this make-up at the instructor's discretion. The student may be required to fulfill additional requirements as specified by the instructor in order to qualify for a make-up test. **No more than one make-up test is allowed per student in this course.** Any test not taken will be assigned a score of zero.

2. Retests are **not** permitted.

3. If you have a physical, sensory, health, cognitive or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor, Ann Lemke, to discuss reasonable accommodations that will help you succeed in this class. She can be reached by phone at 235-7448 or via email lemke@hawaii.edu, or you may stop by Hale `Akoakoa 213 for more information.

4. Students are encouraged to visit WCC's **Aerospace Exploration Lab** (located in Hale `Ilmiloa 135). Besides a large collection of astronomy related resource materials, which the student may borrow for an extra-credit project, there is a hands-on physical science museum. Phone 235-7321. Students are also encouraged to visit the **NASA Flight Training Aerospace Education Laboratory** (`Ilmiloa 112) and **Lanihuli Observatory**.

5. A student can determine his/her current grade at any time during the semester by dividing his/her cumulative score by the cumulative points possible and converting into a percentage and referring to the table of Letter Grades.

6. Any student wishing to be informed of his/her Final Exam grade and/or semester grade in advance of the official report of grades should email a request for the grades to the instructor immediately after the Final Exam. The student may also provide the instructor a stamped, self-addressed postcard or envelope on the day of the Final Exam with an enclosed note requesting the grades.

7. **Extra Credit** (Optional): DUE DATE IS LISTED IN THE SYLLABUS. Worth up to 25 extra points toward the final point total. **PROJECT:** The student is to select a narrow topic in stellar astronomy. After consultation with and approval by the instructor, the student is to write a **six (6)-page report** on the subject using at least **eight (8) references** (book, magazines, videotapes, Internet, interview, etc.). The main text of the paper is to be **typed using double-spacing** and is not to exceed eight (8) pages. **One typed page of references** must also be included. Drawings, photographs and diagrams are optional and are to be included on separate pages from the main text. (see attachment for details.)
Sample Topics for Extra Credit Project

**Maximum Points:** Worth up to 25 extra points (about equal to a quiz grade) toward the final point total.

**PROJECT:** Select a narrow topic in stellar astronomy. You may choose a topic from the list below or you may choose your own topic. If the topic you select is NOT on the list, you are encouraged to consult with the instructor in order to insure that your topic meets the criteria for this extra credit task.

Write a six (6)-page report using at least eight (8) references (which may include books, journal or newspaper articles, videocassette tapes, magazine articles, the internet or personal interviews). ALL references are to be annotated in the main body of the text using the style (authors' last name, year). The main text of the report is to be typed using double-spacing and is NOT to exceed eight (8) pages. **(NOTE: Reports less than 6 pages are acceptable, but will receive less than the maximum number of points.) One typed page of references must also be attached. You may use any of the standard styles for this reference page. Drawings and charts are optional and are to be attached on separate pages from the main text.**

**Sample Topics:**

1. Uses of the Doppler Shift in Stellar Astronomy
2. The Nature of Light: Why is the Sky Blue and What Makes a Rainbow?
3. Music of the Spheres: Johannes Kepler
4. Legends and Myth about the Stars
5. Astrology: Fact or Fantasy?
6. The Maunder Minimum: Solar Effects on Our Climate
7. Archaeoastronomy: Structures Oriented to the Sun
8. Radio Astronomy's Role in Understanding the Universe
9. The Hubble Space Telescope: Eyes on the Universe
10. Mauna Kea: The World's Best Site for Stargazing
11. How the Sun Will End Its Life
12. The Nature of Variable Stars
13. How to Observe a Black Hole
14. The Effects of Cosmic Radiation on the Evolution of Life on Earth
15. Women in Stellar Astronomy
16. Measuring the Size of the Universe
17. Mapping the Milky Way Galactic from the Inside
18. The Future of Interstellar Space Flight
19. Discovering Extrasolar Planets
20. How to Communicate with an Extraterrestrial
<table>
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<tbody>
<tr>
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<td>12</td>
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<td>Chp 1: Astronomy and the Universe</td>
<td>Chp 2: Knowing the Universe</td>
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<td>19</td>
<td>21</td>
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<td>Chp 4: Gravitation and the Waltz of the Planets</td>
<td>Chp 5: The Nature of Light</td>
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<td>Chp 5: The Nature of Light (continued)</td>
<td>Chp 6: Optics and Telescopes</td>
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</table>
| Chp 6: Optics and Telescopes (continued) | IMAGINARIUM
Cosmic Perceptions
QUIZ 1 |
<p>| 9       | 11       |
| Chp 7: Our Solar System | Chp 18: Our Star, the Sun |
| 16      | 18       |
| Chp 18: Our Star, the Sun (continued) | Chp 19: The Nature of Stars |
| 23      | 25       |
| Chp 19: The Nature of Stars (continued) | Chp 19: The Nature of Stars (continued) |
| Mar     |          |
| 2       | 4        |
| Chp 20: The Birth of Stars | Chp 20: The Birth of Stars (continued) |
| 9       | 11       |
| Chp 21: Stellar Evolution: After the Main Sequence | Chp 21: Stellar Evolution: After the Main Sequence (continued) |</p>
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<tr>
<td>16</td>
<td>MID-TERM EXAM</td>
<td>18</td>
</tr>
<tr>
<td>23</td>
<td>SPRING</td>
<td>25</td>
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<td>6</td>
<td>Chp 24: Black Holes</td>
<td>8</td>
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<td>13</td>
<td>Chp 25: Our Galaxy (continued)</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>Chp 27: Quasars, Active Galaxies and Gamma-Ray Bursters</td>
<td>22</td>
</tr>
<tr>
<td>May</td>
<td>Chp 28: Cosmology (continued) QUIZ 4 Extra-Credit Project Deadline</td>
<td>27</td>
</tr>
<tr>
<td>4</td>
<td>Chp 30: Search for Extraterrestrial Life IMAGINARIUM Search for Life</td>
<td>29</td>
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TUES, May 11 FINAL EXAM  11:30am-1:20pm