

College of San Mateo Course Outline

- New Course
 Update/No change
 Course Revision (Minor)
 Course Revision (Major)

Date: 11/17/06

Department: Astronomy Number: 125

Course Title: Stars and Galaxies Units: 3.0

Hours/Week: Lecture: 3

Lab:

By Arrangement:

Length of Course

- Semester-long
 Short course (Number of weeks ___)
 Open entry/Open exit

Grading

- Letter
 Credit/No Credit
 Grade Option (letter or Credit/No Credit)

1. Prerequisite (Attach Enrollment Limitation Validation Form.)

None

2. Corequisite (Attach Enrollment Limitation Validation Form.)

None

3. Recommended Preparation (Attach Enrollment Validation Form.)

None

4. Catalog Description (Include prerequisites/corequisites/recommended preparation.)

Astr 125 Stars and Galaxies (3) Three lecture hours

Students will study the sun, other stars, our Milky Way galaxy, other galaxies and their evolution, black holes, quasars, dark matter, and the foundations of cosmology. Students will become familiar with the basic tenets of general relativity and its application to black holes. The concept regarding stars as the primary producers of energy in the universe as well as the chemicals necessary for life, is emphasized. The focus is on conceptual understanding of stars, galaxies, and the rudiments of cosmology. (CSU/UC)

5. Class Schedule Description (Include prerequisites/corequisites/recommended preparation.)

Astr 125 STARS AND GALAXIES Descriptive astronomy of stars and galaxies. Study of the sun, pulsars, quasars, black holes, and galaxies. Galactic evolution, dark matter, dark energy, and the foundations of cosmology.(CSU/UC)

6. Student Learning Outcomes (Identify 1-6 expected learner outcomes using active verbs.)

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

- a) Discriminate between normal and active galaxies.

- b) Formulate rational opinions on the nature of dark matter and dark energy.
- c) Recognize the importance of the proton-proton chain in the production of the sun's energy.
- d) Contrast the various theories for gamma ray production.
- e) Evaluate the different methods for determining stellar distances.
- f) Assess the significance of the H-R diagram as related to stellar classification.

7. **Course Objectives** (Identify specific teaching objectives detailing course content and activities. *For some courses, the course objectives will be the same as the student learning outcomes. If this is the case, please simply indicate this in this section).*

8. **Course Content** (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, you may attach a sample course syllabus with a timeline.)

See attached

9. **Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Include examples of out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills.)

See attached

10. **Representative Methods of Evaluation** (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)

See attached

11. **Representative Text Materials** (With few exceptions, texts need to be current. Include publication dates.)

Stars, Galaxies, and Cosmology by Bennett, Donohue, Schneider, and Voit 4th edition. Published by Pearson and Addison-Wesley

Prepared by:

(Signature)

Email address:

Submission Date: _____

TOPICAL OUTLINE

- The proton-proton chain as the source of the sun's energy production
- Dark matter, dark energy and the fate of the universe
- Quasars and other active galaxies
- Mystery of gamma ray bursts
- Galaxies and the foundations of modern cosmology
- Our galaxy
- Galaxy evolution
- Star birth
- Surveying the stars
- Bizarre stellar graveyard
- The beginning of time
- Life in the universe

REPRESENTATIVE INSTRUCTIONAL METHODS

GOTO HYBRID Planetarium Star Projector – The usage of CSM's new **GOTO HYBRID** star projector will be one of the principal methods of instruction. Students will be able to see the effect, on the sky, of one's change in latitude as one travels northward or southward from San Mateo. The students will be able to visualize the movement of the sun, stars, and galaxies by means of the star projector. Concepts such as the various types of star clusters and galaxies and the different types of nebulae are easily displayed. Flights through our galaxy and to other galaxies will also be easily shown on the planetarium dome.

CSM's Rooftop Observatory – Our new observatory will allow the student to view nebulae, star clusters and galaxies through our telescopes. Students will be able to take and analyze stellar spectra, as well as the spectra of galaxies, nebulae and quasars. This will give students a great opportunity to perform student research.

After Class Excursions – Students will be given the option to attend a planetarium presentation at our planetarium on the first Friday of the month. The San Mateo County Astronomical Society (SMCAS), meets on those dates. An astronomer from NASA or any of the local universities gives a talk about the latest research in his/her field. Students can also go to CSM's planetarium on the 2nd Friday of the month, to view a planetarium show.

Required Reading Assignments – In the syllabus, are reading assignments, designed to enable the student to keep abreast of the lectures. Within the reading assignments are links to an instructional website in which students can take practice exams, see demos, etc.

Required Homework Assignments – There are weekly homework assignments that enable the student to further hone their skills in understanding the course material. These assignments are designed to enable the student to think critically in arriving at the answers.

REPRESENTATIVE METHODS OF EVALUATION

Exams – There will be from two to three closed book midterm exams. There will also be a final exam that is not cumulative.

Project – There will be a five to eight page written report designed to enable in depth investigation about one aspect of the course. It is found that students can really attain a more thorough understanding of the subject matter once they have written a report.

Extra Credit Assignments –Optional attendance at CSM's planetarium to allow the student to improve his/her grade.