

College of San Mateo Course Outline

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

Date: 12/8/11

Department: Astronomy Number: 203
Course Title: Astroimaging Techniques Units: 4
Total Semester Hours Lecture: 32 Lab: 96 Homework: 64 By Arrangement: 0

Length of Course

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

Grading

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

Faculty Load Credit (To be completed by Division Office; show calculations.):

$32/16 = 2$ FLCs lecture; $96/16 = 6 \cdot 8 = 4.8$ FLCs lab

- Prerequisite** (Attach Enrollment Limitation Validation Form.)
ASTR 103
- Corequisite** (Attach Enrollment Limitation Validation Form.)
- Recommended Preparation** (Attach Enrollment Validation Form.)
- Catalog Description** (Include prerequisites/corequisites/recommended preparation. For format, please see model course outline.)

ASTR 203 ASTROIMAGING TECHNIQUES (4) Minimum of 32 lecture and 96 lab hours per term. Prerequisite: ASTR 103. Hands on learning of various imaging techniques including astrophotography of galaxies and nebulae, spectroscopy, and photometry. (AA, CSU)
- Class Schedule Description** (Include prerequisites/corequisites/recommended preparation. For format, please see model course outline.)

ASTR 203 ASTROIMAGING TECHNIQUES (4) Minimum of 32 lecture and 96 lab hours per term. Prerequisite: ASTR 103. Hands on learning of various imaging techniques including astrophotography of galaxies and nebulae, spectroscopy, and photometry. (AA, CSU)
- Student Learning Outcomes** (Identify 1-6 expected learner outcomes using active verbs.)
Upon successful completion of the course, the student will be able to:
 - 1) Skillfully image stars and galaxies using CCD cameras.
 - 2) Perform basic photometry of variable stars.
 - 3) Collect and analyze spectroscopic data using Vspec analysis software.
- 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. In this case, "Same as Student Learning Outcomes" is appropriate here.)

Same as SLO's

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, a sample course syllabus with timeline may be attached.)

ASTROPHOTOGRAPHY - Image galaxies, clusters, and nebulae, using CCD cameras and appropriate software. Learn basic processing skills using image processing and stacking software.

PHOTOMETRY - Carry out basic photometric procedures including making graphs of variable stars and extrasolar planets.

SPECTROSCOPY - Collect and analyze spectroscopic data to identify spectral types and stellar temperatures.

9. **Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Describe out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills. **If hours by arrangement are required, please indicate the additional instructional activity which will be provided during these hours, where the activity will take place, and how the activity will be supervised.**)

CSM Rooftop Observatory - Our observatory is equipped with state of the art telescopes, mounts, CCD cameras, and spectrograph for imaging and data gathering. Under proper supervision, students will learn all procedures for using equipment, and data processing. This will allow the student to analyze his/her own data of galaxies, quasars, and variable stars.

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.

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.)

Portfolio - Photographs, data, graphs, and notes of work performed.

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 a specific topic 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.

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

CSM Imaging Manual -

- a) Telescope and CCD camera operation.
- b) Photometry procedures.
- c) Spectroscopy procedures.
- d) Image processing using Maxim DL and CCDStack.
- e) Hand-outs

On Line Resources - Information about current astronomy events such as comets, asteroids, and solar activity.

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.

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