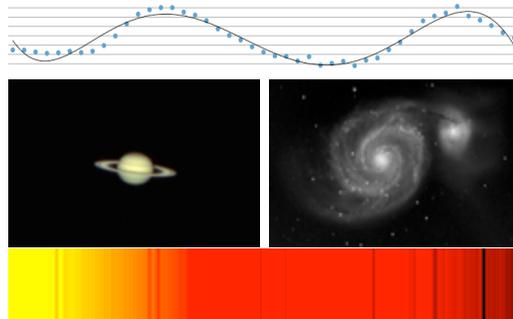


# Astroimaging and Observatory Operation

## General Information



## -General Information and Study Skills

### **AOOC**

AOOC program is designed such that upon completion, students are qualified to operate any observatory, and apply various imaging techniques to gather and analyze astronomical data. Furthermore, students can apply their course load for this program toward a BS degree upon transfer to any four-year institution that offers such a degree, with minimal modification.

Observatories around the world are in need of qualified technicians that can operate telescopes and various imaging instruments to collect astronomical data and advance the field of astronomy. There is a high demand for such technicians and there are very few institutions that can train the students in that field.

**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 equipment operation, imaging, and data processing. This will allow the student to analyze his/her own galactic and stellar data.

**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 where 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 correct answers.

**After Class Excursions** – Students will be given the option to attend the monthly speakers series in the 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 2<sup>nd</sup> Friday of the month, to view a planetarium show.

**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.

**203 ASTROIMAGING TECHNIQUES (4) *Minimum of 48 lab hours per term.***

**Prerequisite:** *ASTR 103.* Hands on learning of various imaging techniques including astrophotography of galaxies and nebulae, spectroscopy, and photometry. Prerequisite: ASTR 103 (AA: Area E5a, CSU: Area B3, UC: Area 5A)

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 plotting light curves of variable stars and extrasolar planets.

SPECTROSCOPY – Collect spectroscopic data and learn basic processing skills, to identify spectral types and major features.

**204 APPLICATION of ASTROIMAGING TECHNIQUES (4) *Minimum of 48 lab hours per term.*** **Prerequisite:** *ASTR 203.* Application of techniques learned in Astro 203 to gather data about celestial bodies. Topics investigated will include the use of spectroscopy to determine stellar composition and photometry to verify times of ingress and egress of transiting extrasolar planets. In addition, observatory control fundamentals will be emphasized and planned imaging runs will be an important component.

ASTROPHOTOGRAPHY – Using skills learned in ASTR 203, image and identify galaxy types, star clusters, and nebulae. Also explore quasars, comets, and solar activity, using CCD cameras, DSLR, and video cameras. Develop further image processing skills with CCD Stack.

PHOTOMETRY – Using skills learned in ASTR 203, investigate contact binaries, cataclysmic and other variables stars, asteroids, and extrasolar planet transits. Use of Binary Maker 3.

SPECTROSCOPY – Using skills learned in ASTR 203, gather spectroscopic data to identify spectral types, Doppler shift, and stellar velocities. Also investigate novae and gas planets.