ASTR 110L: Introduction to Astronomy Laboratory

CRN 62135, 1 Credit
Monday, 1:30PM-4:00PM, Imiloa 137

INSTRUCTOR: **Marvin Kessler**
OFFICE: **'Imiloa 136**
OFFICE HOURS: **MWF, 10:30AM-11:20AM**
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EFFECTIVE DATE: **Fall 2009**

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

Demonstration of astronomical principles through laboratory observations and analysis of astronomical data. **Prerequisite**: ASTR 110; may be taking ASTR 110 concurrently.

Activities Required at Scheduled Times Other Than Class Times: there will be one evening observing session. Student may substitute for this session if they have serious and compelling circumstances which make it impossible for them to attend this evening session.

STUDENT LEARNING OUTCOMES

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

1. Apply the scientific method to a selected group of topics in astronomy.
2. Collect, report and analyze data obtained in a laboratory and/or observatory setting in a manner exhibiting organization, proper documentation and critical thinking.
3. Demonstrate a basic understanding of the use of standard astronomical instruments.
4. Perform image analysis, especially as related to astronomical photographic data
5. Identify environmental factors which affect the outcome of an experiment or observation and apply basic error analyses techniques.
6. Demonstrate a working knowledge of computer on-line and internet astronomical programs.

COURSE CONTENT and SKILLS

Concepts or Topics	*Skills or Competencies: student will be able to:*
1. Star Motions	***1.locate stars based on right ascension and declination***
2. Star Identification	***2.identify four bright stars and four constellations for each season of the year***
3. Crater Formation	***3.demonstrate how crater size corresponds to the kinetic energy of an impactor***
4. Magnification by a simple lens system	***4.Verify the simple lens formula and calculate magnification***
5. Astrometry of asteroid detection	***5.use an astrometry computer program to detect asteroids***
6. Spectroscopy of emission spectra	***6.identify gases by their spectra***
7. Photometry of Variable Star	***7.create light curve of a variable star***
8. The Hertzsprung-Russell Diagram	***8.locate a star on the H-R Diagram based on the star's luminosity and temperature***
9. Real Time Observing	***9.sketch and report on Moon, planets, and five other objects, using Lanihuli Observatory***
10. Image Processing	***10.process RGB images of a galaxy and other astronomical objects***

ASSESSMENT TASKS AND GRADING

Evaluation of the successful completion of the objectives of this course will be determined by grades received on Laboratory Reports and tests of ability to identify stars and manipulate instruments.

• **Laboratory Reports**: Lab reports are completed according to the instructions given in the lab manual and/or on the handouts distributed at each lab session. Ordinarily, the report consists of a completed data and analysis sheet provided in the handout plus any other appropriate sheet of observed data and graphical analysis. Lab Reports are worth **20 points** each**. The lowest lab score will be dropped from the student's record.** A protocol sheet explains the procedure to be followed in handing in the completed report to the instructor. There will be 12 reports that are counted, worth a total of 240 points.

Final semester letter grade will be based on the following table:

Letter Grade	Definition
A	90% - 100% of cumulative points possible
B	80% - 89% of cumulative points possible
C	70% - 79% of cumulative points possible
D	60% - 69% of cumulative points possible
F	below 60% of cumulative points possible

Other grades may be assigned as listed on page 23 of the 2008-2009 WCC Catalog.

LEARNING RESOURCES

TEXTBOOKS AND OTHER ASSIGNED INSTRUCTIONAL MATERIALS:

- *Astronomy Media Workbook (5th Edition)* by Michael C. LoPresto
- Supplementary laboratory experiments will be described in handouts

REQUIRED MATERIALS: calculator (non-scientific); metric ruler

Additional Information

1. **Expectations of Students**: Success in this course will be enhanced by:
    - having a positive, inquiring attitude toward science
    - making use of the full 2 1/2 hours of lab time
    - complete the report in a professional manner
    - reading the workbook carefully and making notes and use of handouts and other learning materials whenever necessary
    - seeking assistance from the instructor
    - attending all classes and responsibly obtaining all assignments and/or changes to the course syllabus

2. A student can determine his/her current grade during any time of 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.

3. Students are encouraged to visit WCC's **Aerospace Exploration Lab** (located in Hale `Imiloa 135). Besides a large collection of astronomy related resource materials which the student may borrow, there is a hands-on physical science museum. Phone 235-7321.

4. 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.

CALENDAR FOR FALL 2009

Aug.	24 Introduction and Tour of Facilities *Astronomy Media Workbook*, Activity One, p. 129, Introducing SkyGazer	
	31 *Astronomy Media Workbook,* Activity Two, Motions of Stars, p.139, and Activity Three, Celestial Sphere, p.147.	
Sept.	7 HOLIDAY:Labor Day	
	14 *Astronomy Media Workbook*, Activity Six, Seasonal Constellations, p. 177 Prepare maps and spend one hour in Imaginarium	
	21 Imaginarium: Test, using maps	
	28 Crater Formation Use of Lunar maps	
Oct.	5 Optics:magnification and simple lens formula	
	12 Observing. This lab is fulfilled by spending three observing sessions of about ½ hour each in Lanihuli Observatory, sketching Moon, planets, and 5 other objects, and completing written report	Telescope: Tables 1, 2,3 .
	19 *Astronomy Media Workbook*, Activity 16, Asteroid Discovery. Introduction to "Astrometrica"	Telescope: Tables 4, 5, 6
	26 Asteroid Identification, using "Astrometrica" and websites for Near Earth Orbiting Objects	
Nov.	2 Spectroscopy of Emission Spectra	
	9 Working with the Telescope	
	16 *Astronomy Media Workbook,* Activity 19, HR Diagram	Telescopes: Tables 7, 8, 9
	23 Photometry using "Iris"	
	30 Tables 1 – 9 complete activities they missed when they worked with telescope	Telescopes: Table 10
Dec.	7 Image Processing, using DS9 and RGB images of galaxies and other objects	