

## COURSE OUTLINE

### **Astronomy 102 Observational Astronomy**

#### **I. Catalog Statement**

Astronomy 102 maps the sky by means of bright stars and constellations. Small telescopes will be used for observing celestial objects.

Units: - 1

Laboratory Hours - 3.0

Prerequisite: Astronomy 110 or Astronomy 120

(Faculty Laboratory Hours 3.0 + Student Laboratory Hours 0 = 3.0 Total Laboratory Hours)

#### **II. Course Entry Expectations**

Prior to taking this course the student should be able to:

1. explain how the work of Copernicus, Galileo and Newton changed astronomers' view of the universe;
2. use the Internet to find information about and images of space missions and solar system objects;
3. identify different kinds of light and different kinds of telescopes;
4. describe how spectra are used to study some properties of objects in the solar system;
5. describe how space probes are used to study objects in the solar system;
6. identify planets and their features from photographs and slides;
7. interpret tables of data about planets and satellites;
8. summarize current theories about the origins of objects in the solar system.

-or-

1. explain how the work of Shapley and Hubble changed our ideas about the size of the universe;
2. explain the way in which photographs and spectroscopy are used to study stars and galaxies;
3. list several kinds of non-visible light and the objects that emit it;
4. interpret tables of data about stars and galaxies;
5. identify a variety of "deep sky" objects from photographs and slides;
6. list the sequence of stages in the lifetime of a star;
7. explain why a star goes through these different stages;
8. compare Newton's and Einstein's ideas about space and time;

9. explain the role of Einstein's ideas in modern studies of gravity, black holes, and cosmology;
10. use the Internet to find information about and images of stars and galaxies;
11. discuss current controversies in astronomy concerning quasars, the distance scale, galaxy formation and the age of the universe.

### **III. Course Exit Standards**

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

1. know and understand the way telescopes, photometers and spectrographs are used to collect astronomical data;
2. appreciate the uncertainties in the fundamental data of astronomy;
3. analyze the validity of conclusions drawn from observational data.

### **IV. Course Content**

- |    |   |          |
|----|---|----------|
| A. | Star and constellation identification                                     | 6 hours  |
|    | 1. Bright stars   |          |
|    | 2. Myths and star patterns  |          |
| B. | The celestial sphere  | 6 hours  |
|    | 1. Co-ordinate systems  |          |
|    | 2. Celestial motions  |          |
|    | a. Phases of the Moon   |          |
|    | b. "Fixed" stars and "wandering stars" (planets)                          |          |
| C. | The use of astronomical references  | 3 hours  |
|    | 1. Star charts and atlases  |          |
|    | 2. Catalogs and almanacs  |          |
| D. | Telescopes  | 15 hours |
|    | 1. Simple optics of lenses and mirrors                                    |          |
|    | 2. Equatorial mounts and telescope drives                                 |          |
|    | 3. Using setting circles to find celestial objects                        |          |
|    | 4. Using a telescope and a digital camera to photograph celestial objects |          |
| E. | Telescope observations  | 12 hours |
|    | 1. The Moon   |          |
|    | 2. The Sun  |          |
|    | 3. Planets  |          |
|    | 4. Deep sky objects   |          |
| F. | Different kinds of light  | 6 hours  |
|    | 1. The electromagnetic spectrum   |          |
|    | 2. Observatories in space   |          |

## **V. Methods of Presentation**

The following instructional methodologies may be used in the course:

1. Use of small telescopes;
2. selected video-clips;
3. traditional black/white board lecture presentation;
4. powerpoint presentations;
5. internet utilization

## **VI. Assignments and Methods of Evaluation**

1. Quizzes
2. Laboratory Reports
3. Practical examinations

## **VII. Textbook (optional)**

Jandorf, H.. Astronomy Lab Manual.  
Dubuque: Kendall/Hunt Publishing, 2002  
10<sup>th</sup> Grade Textbook Reading Level

## **VIII. SLO**

1. Understand the methods astronomers use to study objects in the solar system.
2. Know the results of Earth-based and space probe studies of objects in the solar system.