MASTER COURSE OUTLINE
Prepared By: Jim Hamm Date: Sep 2017

COURSE TITLE
Observational Astronomy

GENERAL COURSE INFORMATION
Dept.: ASTR Course Num: 105 (Formerly:)
CIP Code: 40.0201 Intent Code: 11 Program Code: N/A
Credits: 3
Total Contact Hrs Per Qtr.: 40
Lecture Hrs: 28 Lab Hrs: 12 Other Hrs: 0
Distribution Designation: Specified Elective SE

COURSE DESCRIPTION (as it will appear in the catalog)
A descriptive overview of astronomy with particular emphasis on observation. Lectures will cover the solar system, the Earth-Moon system, stellar systems, celestial motion, the history of visual astronomy, optical aids and observing techniques. This course is not intended to be part of a physical science pre-major.

PREREQUISITES
None

TEXTBOOK GUIDELINES
A recent edition of a text such as *Nightwatch: A Practical Guide to Viewing the Universe*, Terence Dickinson, or *The Backyard Astronomer's Guide*, Terence Dickinson and Alan Dyer

COURSE LEARNING OUTCOMES
Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:
1. Identify constellations, stars, planets, and other objects;
2. Demonstrate familiarity with the construct of the dynamic celestial sphere;
3. Demonstrate the ability to use a planisphere and star chart;
4. Demonstrate understanding of basic properties of light;
5. Demonstrate understanding of fundamentals of human vision as they apply to astronomical observation;
6. Demonstrate understanding of atmospheric conditions, including light pollution, pertinent to visual astronomy;
7. Demonstrate the ability to use binoculars and telescopes to view astronomical objects;
8. Demonstrate understanding of properties of telescopes including magnification, light-gathering power, and resolving power;
9. Demonstrate understanding of moon phases and surface features;
10. Demonstrate understanding of solar observation technique;
11. Acquire basic familiarity with solar features;
12. Research celestial objects and locate them in the sky;

13. Demonstrate understanding of universal, standard, daylight, local and sidereal times; demonstrate understanding of eclipses.

Desirable but not essential objectives for the student include experience with and ability to use computer programs for the amateur astronomer and basic familiarity with astronomical photography.

INSTITUTIONAL OUTCOMES

None

COURSE CONTENT OUTLINE

In order to keep course content in concert with the viewing labs, this outline may be presented in various orders from one academic term to the next.

Week 1: Welcome
Overview of the course
Introduction to visual astronomy

Week 2: Constellations and the celestial sphere
Use of a planisphere
Basic properties of light
Vision and viewing techniques

Week 3: Tour of the universe
Constellations of the season
Use of star charts
Binoculars and telescopes

Week 4: Use of star atlases
Time: Universal, standard, daylight, local
The [current year] Guide to the Heavens

Week 5: Computer programs for amateur astronomers
Review and Unit I test

Week 6: Stars
Multiple star systems
Open clusters
Globular clusters
Planetary nebulae
Galaxies
Galactic clusters

Week 7: Planets
Asteroids

Week 8: The sun-earth-moon system
The solar year
Seasons
Lunar phases
The barycenter
Orbital characteristics of this system

Week 9: Eclipses
Total solar eclipse
Annular eclipse
Partial solar eclipse
Total lunar eclipse
Partial lunar eclipse

Ascending and descending nodes Eclipse seasons
Viewing techniques

Week 10: Comets
Meteors
Aurorae

Week 11: More about telescopes
Astronomical photography

Viewing labs: The actual schedule of viewing labs must vary from one academic term to the next, because it must be planned in concert with celestial events and weather. Given good weather, about five 2 ½ -hour labs will be conducted. Typical lab content would be as follows.

Lab 1: Equipment: Binoculars. Unaided viewing stressed.
Constellation identification
Planet identification
Lunar observation
Rotation of the celestial sphere
Use of averted vision

Lab 2: Equipment: Telescope, binoculars.
Constellation identification
Review of lab 1
Telescope operation: Aiming, focusing, averted telescopic vision
Telescopic viewing of planets

Lab 3: Equipment: Telescope, binoculars.
Constellation identification
Review of lab 2
Telescopic viewing of the moon

Lab 4: Equipment: Telescope, binoculars.
Constellation identification
Review of lab 3
Telescopic viewing of multiple stars and deep-sky objects
Students practice telescope use, finding objects

Lab 5: Equipment: Telescope, binoculars
Constellation identification
Continuation of viewing begun in lab 4

DEPARTMENTAL GUIDELINES *(optional)*

PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

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DIVISION CHAIR APPROVAL **DATE**