Warren County Community College

PHY 105 Astronomy
Course Master Syllabus

Course Information

Catalog Description: This course is an introduction to astronomy and astrophysics. Broad review of basic physical concepts such as force, energy, momentum, and temperature will be covered. The course surveys the evolution of the universe from the Big Bang onwards: what happens in the first few minutes of the universe's life; star formation, structure, and evolution; the physics of white dwarfs, neutron stars, and black holes; galaxy formation and structure; and cosmology. Using the scientific method, the roles of quantum physics, particle physics, and relativity in astrophysics are examined. The course further reviews the overall architecture of the solar system, motion of the celestial spheres, major planets, the earth-moon system, minor planets, comets and life in the solar system and beyond.

Prerequisite(s): None

Corequisite(s): None

Credits: 3

Hours: 3

Required Text(s):

Supplemental Materials:

Instructor Information

Instructor's Name:

Contact Information:

Office Hours:

Program Goals

- Apply the scientific method in experimentation and data analysis.
- Analyze complex scientific problems, perform calculations, and evaluate solutions.

- Communicate scientific information clearly through both oral and written communication.
- Critically analyze problems through gathering data from multiple sources and apply findings to new scenarios.
- Describe fundamental biological, chemical, and physical principles, including, but not limited to, molecular and cellular functions, anatomy and physiological function, inheritance, and both organic and inorganic chemical reactions.
- Interpret results from experimentation that utilizes modern laboratory techniques and instrumentation.

Class Core Competencies

The following core competencies are embedded in this curriculum:

- Communicate effectively in both speech and writing.
- Apply appropriate mathematical and statistical concepts and operations to interpret data to solve problems.
- Use scientific method of inquiry, through the acquisition of scientific knowledge.
- Use computer systems or other appropriate forms of technology to achieve educational and personal goals.
- Understand ethical issues and situations.
- Address an information need by locating, evaluating, and effectively using information.

Class Learning Assessment

Student Learning Outcomes	Suggested Means of Assessment

Grading System

Letter Grade	Percentage Range
A	90 to 100 percent
B Plus (B+)	87 to 89.9 percent
B	80 to 86.9 percent
C Plus (C+)	77 to 79.9 percent
C	70 to 76.9 percent
D	60 to 69.9 percent
F	Below 60 percent

College Information

Disability Services
Disability Services Webpage

Statement and Policy on Cheating, Plagiarism, and Academic Conduct
Academic Conduct Policy (Policy 304) [PDF]

Students are required to perform all the work specified by the instructor and are responsible for the content and integrity of all academic work submitted. A violation of academic integrity will occur if a student: (1) knowingly represents work of others as one's own, (2) uses or obtains unauthorized assistance in any academic work, (3) gives fraudulent assistance to another student, or (4) furnishes false information or other misuse of college documents.

Unauthorized use of Artificial Intelligence (AI) is prohibited unless the instructor explicitly permits it in the syllabus or assignments. If tools such as ChatGPT are permitted by an instructor to be used for an assignment, they should be used with caution and with proper citation. In all such cases, you may only use the specific tools identified as acceptable and you must adhere to the College's standards for attribution, validation, and transparency.

In cases of suspected violation of academic integrity, the incident is to be reported to the Office of Academics. A student found guilty of violating the rule of academic integrity by the Vice President of Academics will be considered to have failed in personal obligation to the College; such failure will be subject to disciplinary action by the College. Unless otherwise notified, the instructor will allow students who are pending disciplinary action to attend class.

Tutoring and Testing at the Instructional Support Center (ISC)

- Instructional Support Center (ISC) Webpage

WCCC Library Services

- WCCC Library Website

Citation Styles and Formatting

Work submitted for any Warren County Community College course must conform to the required formatting and citation style that are specified by the instructor. The Library and Instructional Support Center can assist students with formatting and citations for assignments and papers.

WCCC Attendance Expectations

The College expects students to attend and participate in all classes. This involves sharing discussions and lectures in class, as well as interacting with other students. Grades are based on the quality of work students complete in meeting the requirements for a particular course, as stated in the course syllabus and catalog description. Attendance, among other factors, may be an additional criterion for assigning grades. Students should realize that they are responsible for all class meetings and that work missed because of absences may affect their grades. Attendance in online classes is determined by the completion of assignments/ tests. Students who have not completed any assignments or tests will be considered non-attending and receive an NF grade in online classes.

Class Attendance Expectations

Topical Outline

1. Astronomy as a Science
2. The Scientific Method
3. Force, Motion and The Law of Gravity
4. Energy and Gravitation
5. Conservation Laws and Orbits
6. Light as an Electromagnetic Wave
7. Temperature and Radiation
8. Telescopes
9. The Solar System
    a. The Sun
    b. Earth as a Planet
    c. Venus & Mars

    d. The Giant Planets
    e. Rings, Moons, and Pluto
    f. Comets and Asteroids
10. Introduction to Nuclear Physics
11. Stars
12. The Hertzsprung-Russell Diagram
13. Introduction to Stellar Evolution
    a. Stellar Life Cycles: Birth and Death
    b. Supernova Explosions
    c. Neutron Stars
    d. Star Formation and Exoplanets
    e. Stellar Evolution
    f. The Death of Stars Black Holes, and Relativity
    g. Binary Stars
14. The Milky Way Galaxy
    a. Galaxy Formation
    b. Black Holes & Relations to Galaxy Formation
15. Dark Matter
16. Galaxy Formation and Evolution
17. Supermassive Black Holes
18. Galaxy Classification
19. Introduction to Cosmology
20. Cosmology: The Expanding Universe
21. The Big Bang Theory
22. The Large-Scale Structure of the Universe
23. The Final Fate of the Universe

Grading Methods

Assignment	Points/Percentage

Class Itinerary

Week / Unit	Topic	Readings/Assignments