PHY 105 Astronomy

Course Master Syllabus

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): N/A

COREQUISITE(S): N/A

CREDITS: 3 **HOURS**: 3

REQUIRED TEXT: Seeds, M. & Backman, D. (2018). *Foundations of astronomy* (14th ed). Cengage.

ISBN: 978-1337399920

REQUIRED TEXT: Seeds, M. (2019). *Stars & galaxies* (10th ed). Cengage.

ISBN: 978-1337399944

REQUIRED TEXT: Seeds, M. (2019). *The solar system* (10th ed). Cengage.

ISBN: 978-1337399937

CENGAGE COURSE KEY:

SUPPLEMENTAL MATERIALS:

INSTRUCTOR:

OFFICE HOURS:

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; Address an information need by locating, evaluating and effectively using information.	
LEARNING ASSESSMENT	
Student Learning Outcomes:	***Suggested Means of Assessment:***
Explain and calculate how the properties of distant stars and galaxies are measured, using observations from the Earth and space.	Reaction Paper #1 with Calculations
Explain why the Sun shines, and why it will not do so forever.	Discussion Post; Quiz/Test
Research and describe how most chemical elements are synthesized in stellar cores through nuclear fusion.	Mini Research Paper
Explain how the Sun and other stars form and die.	Discussion Post; Quiz/Test
Compare and contrast how the Milky Way Galaxy we live in is similar to (or different from) other galaxies.	Reaction Paper #2
Discuss theories on why many galaxies have black holes at their center.	Discussion Post; Quiz/Test
Identify what the main constituents of the Universe are, describe how it began, and predict what its ultimate fate will be.	Discussion Post; Quiz/Test
Recognize the impact of radiation from the Sun on astronauts, Lunar exploration, Mars Exploration and eventual deep space exploration. Compare and contrast the advantages of manned space flight to robotic space operations.	Research Paper
GRADING SYSTEM:	C+ = 77 < 80
A = 90 < 100	C = 70 < 77
B+ = 87 < 90	D = 60< 70
B = 80 < 87	F = Below 60

DISABILITY SERVICES STATEMENT: Warren County Community College is committed to providing all students equal access to learning opportunities. Student Services is the campus office that works with students who have disabilities to provide and/or arrange reasonable accommodations. Students who have, or think they may have, a disability (e.g. mental health, learning, vision, hearing, physical or systemic), are invited to contact Student Services to arrange

a confidential discussion at (908) 835-2300 or by email at StudentServices@warren.edu as soon as possible. Students registered for Disability Services with Student Services, who have requested accommodations for the current semester will be provided with an electronic letter detailing individual accommodations and are encouraged to contact the instructor early in the semester to discuss accommodations outlined in their letter.

INSTRUCTIONAL SUPPORT CENTER: The Instructional Support Center (ISC), located in Room 105 across from the library, provides academic support at no cost to WCCC students and is available for courses in which they are currently enrolled. The ISC is staffed with trained professional and peer tutors who are ready to help you understand and succeed. For scheduling or further information, visit the ISC in person, online at http://www.warren.edu/tutoring/ or by telephone at (908)835-2354.

STATEMENT AND POLICY ON CHEATING, PLAGIARISM AND ACADEMIC DISHONESTY: 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.

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.

REQUIRED FORMAT FOR RESEARCH PAPERS: Research papers written for any Warren County Community College class must conform to the required documentation style. Papers written for humanities (and some social science) classes will follow the most recent edition of the Modern Language Association (MLA) in-text citation and bibliographic methods. Social science and science papers will require the use of the most recent edition of the American Psychological Association (APA) in-text citation and bibliographic methods.

Please consult with your instructor regarding the correct documentation style to use in his/her class.

ATTENDANCE POLICY: Students are expected to attend all class sessions of courses in which they are enrolled and are responsible for all material presented in class and all homework assignments.

Grades are based on the quality of work completed in meeting the requirements for a particular course, as stated in the course syllabus and catalog description.

Excessive absence may be considered sufficient cause for dismissal from class by an instructor or other appropriate college staff member. Any decision to exclude a student from class or the

College due to excessive absence shall be subject to review by the President in accordance with established procedures. Students who have not attended class are not entitled to a refund of tuition.

WCCC HAYTAIAN & MAIER LIBRARY

Text: 908-652-4445 Email: lstoll@warren.edu

http://warren.libguides.com

Please see the library's website above for current semester hours.

The WCCC Library offers a wide range of services to students specific to the information literacy goals of the College which includes suggesting research strategies, facilitating the use of both digital and print resources, as well as assisting students with citations to avoid plagiarism.

The library also serves as the College's computer space, with computers for students to use when the library is open. Students also have free, unlimited printing from the College's computers, as well as space to study.

The library is where students can get their college student ID cards. All students are required to get a student ID card and carry it while on campus for security purposes. To get a student ID card, you must bring another form of ID to the library. You may also be asked to bring a printed copy of your current class schedule. You can get a student ID card any time that the library is open. These cards do not expire and can be used for your duration at WCCC.

Additionally, the library participates in a national inter-library loan program which is available free to all students and faculty. You can submit ILL requests by emailing the librarian or by stopping by the library's circulation desk.

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:

ITINERARY: