FLORIDA POLYTECHNIC UNIVERSITY

Welcome to AST 4300 – Galaxies and the Universe

This course is a physics elective course that will be offered in the spring at most once every two years for juniors and seniors in the Physics major as part of the Astrophysics Concentration and as a Physics Elective in the Engineering Physics major.

Academic Integrity

The faculty and administration take academic integrity very seriously. Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties. Do not compromise your integrity for a perceived short-term gain.

Course Information

- **Course Number and Title:** AST 4300 Galaxies and the Universe
- **Credit Hours:** 3 (lecture)
- **Academic Term:** offered spring of even years

Office Hours

Instructor	Email and Office	Monday	Tuesday	Wednesday	Thursday	Friday
Dr. Eckert	seckert@floridapoly.edu; IST-2104		11:00-12:00		11:00-12:00	10:00-11:00

Official Catalog Course Description:

- **Course Description:**
  This course introduces the structure and properties of galaxies including our Milky Way Galaxy and nearby satellite galaxies. Topics include the nature of spiral, irregular, and elliptical galaxies, the formation and evolution of galaxies, and the role of dark matter in galaxies. Active galaxies, cosmology, and the early universe will also be discussed.
- **Prerequisites:** PHZ 3101-Modern Physics.

Required Texts and Materials:

- **Required Text:** An Introduction to Modern Astrophysics by Carroll and Ostlie. ISBN: 978-1108422161
- **Equipment and Materials:** Scientific calculator (required for homework, quizzes, and exams). Canvas (Instructor Notes, Homework and Reading Assignments, and Grades). University Email for any relevant reminders and updates.

Course Objectives: This course (through lecture, student coursework, etc.) is intended to:

- **Extend** existing knowledge of physical concepts (e.g., gravity, properties of light, and concepts from Modern Physics),
- **Develop** an understanding of the properties of galaxies and the Universe and how those properties have been determined, and
- **Refine** methodologies to derive a clear and concise solution from provided information.

Course Learning Outcomes: Upon completion of the course, students should be able to

- **Synthesize** knowledge of mathematics and physics applied to the nature of galaxies and the Universe.
- **Integrate** scientific knowledge and **discuss** scientific information.
- **Create** accurate solutions based on relevant physical principles.

Alignment with Program Outcomes:
Program Learning Outcomes and General Education Competencies may be found in the Academic Catalog (http://catalog.floridapoly.edu/).

Student Learning Outcomes (SLO) Table

Course Learning Outcome	Bloom's Learning Level	Program Learning Outcome	ABET LO
Synthesize knowledge of mathematics and physics applied to the nature of galaxies and the Universe.	**Evaluate** Interpret Differentiate Validate	**1) apply** knowledge of physics and mathematics to real world situations	**1**
Integrate scientific knowledge and **discuss** scientific information.	**Analyze** Contrast Dissect Explain	**2) produce** clear and concise solutions, and effectively **communicate** scientific results, and **5)** critically **evaluate** scientific literature.	**2,7**
Create accurate solutions based on relevant physical principles.	**Evaluate** Check Critique	**2) produce** clear and concise solutions, and effectively **communicate** scientific results	**2**

Course Schedule

Below is the schedule for this course. The Homework and Reading Assignments are due on Canvas at 11 pm on the date indicated below.

Week (Dates)	Sections and Topics	Tuesday	Thursday
1 (Jan 7 & Jan 9)	24.1-24.2		**RQ1**
2 (Jan 14 & Jan 16)	24.3-24.4	**HW 1**	**RQ2**
3 (Jan 21 & Jan 23)	**Review**	**HW 2**	**Exam 1**
4 (Jan 28 & Jan 30)	25.1		**RQ3**
5 (Feb 4 & Feb 6)	25.2-25.3	**HW 3**	**RQ4&5**
6 (Feb 11 & Feb 13)	25.4	**No Class (Career Day)**	**HW 4**
7 (Feb 18 & Feb 20)	26.1-26.2	**HW 5**	**RQ6**
8 (Feb 25 & Feb 27)	**Review**	**HW 6**	**Exam 2**
9 (Mar 4 & Mar 6)		**No Class (Spring Break)**	
10 (Mar 11 & Mar 13)	27.1-27.3		**RQ7**
11 (Mar 18 & Mar 20)	28.1-28.2	**HW 7**	**RQ8**
12 (Mar 25 & Mar 27)	28.3-28.4	**HW 8**	**RQ9**
13 (Apr 1 & Apr 3)	**Review**	**HW 9**	**Exam 3**
14 (Apr 8 & Apr 10)	29.1-29.4		**RQ10**
15 (Apr 15 & Apr 17)	30.1-30.2	**HW 10**	**RQ11**
16 (Apr 22 & Apr 24)	**Review**	**HW 11**	**No Class (Reading Day)**
17 (Apr 29 & May 1)		**Final Exam**	

Course Policies

Requirements and Evaluation

Your grade will be based on:

(5%) participation and attendance,
(5%) reading assignments,
(20%) homework assignments, and
(70%) four exams, the highest three are worth 20% and the lowest is worth 10%.

Attendance and Participation

- Students in this course are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP).
- A+ Attendance will be used to track attendance. Falsifying attendance for yourself or for another student is an act of academic dishonesty and is considered a violation of the university's academic integrity policy.
- If you must miss class for a justifiable reason, then please make sure that the absence is excused in a timely manner by sending me an email as soon as possible.
- You will receive a ½% percent deduction from your final grade for each unexcused absence, after the first 2, or for any failures to respond in class, up to the 5% total allocated to attendance.

Homework and Reading Assignments

There are two types of assignments that need to be completed on Canvas throughout the semester.

- The reading assignments are designed to provide brief checks of key terminology and straightforward applications of equations introduced in the assigned textbook sections, unless otherwise noted. These assignments are due on Canvas by 11:00 pm on the listed due date.
- Homework assignments consist of approximately five problems requiring clear, concise, and well-organized solutions. A complete solution is expected to include the appropriate physical assumptions and equations (with diagrams or justifications where helpful), clearly articulated and correct mathematical steps, proper use of units and scientific notation, and a final numerical answer with correct units. Completed solutions must be uploaded to Canvas by 11:00 pm on the listed due date.
- Your grade in both categories will be calculated with one assignment of each type dropped. This rule does not apply to unattempted assignments.

Exams

There will be three mid semester exams, and a non-comprehensive final. Each exam will have five to ten total questions, some may be multiple choice, discussion questions, and others may require work to be shown.

- The mid semester exams will occur in class during our regular class time.
- You must bring a calculator for every exam.
- Make-up exams will be given only in extreme circumstances with a documented excuse. If you miss an exam because you are sick or participating in a college-sponsored activity, inform your instructor before the exam and provide them with documentation.

Solutions to Free Response Problems

You will see a demonstration of algebraic manipulation of equations during the lectures. For the free response homework and exam problems, include an algebraic solution before the quantities and units are placed in. The following is a checklist for what is looked for in a complete and correct solution:

- the correct initial equations/justifications/diagrams are used,
- the mathematical steps are correct, and an algebraic solution is determined,
- all units and scientific notation are properly substituted, and
- the numeric solution is boxed with the correct units.

Late Work

- Contact your instructor if you need an extension of a homework or reading assignment for a justifiable reason.
- Late homework or reading assignments that have not been excused will not receive credit.

Grading Scale

Below is the grading scale that will be used in the course. (See also University Grading Policy).

	90%> B+ >87%	80%> C+ >77%	70%> D+ >67%	
A >93%	87%> B >83%	77%> C >73%	67%> D >60%	F <60%
93%>A- >90%	83%> B- >80%	73%> C- >70%		

Official Email Address

Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently (at least once per day). We cannot reply to any email received from an address other than those that end in floridapoly.edu.

University Support and Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The University, through the Office of Disability Services (ODS), facilitates reasonable accommodation for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodation.

If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive.
If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible.

The Office of Disability Services (ODS):
DisabilityServices@floridapoly.edu
(863) 874-8770
The Access Point
ODS website: http://www.floridapoly.edu/disability

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required

to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discussion resources and options available.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action).

Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is ***prohibited****.*