

**NOTE:** This course complies with all UF academic policies. For information on those policies and for resources for students, please see UF's "[Academic Policies and Resources](#)" web page.

## I. General Information

**Meeting days and times:** M,W,F: 4:05-4:55 PM

**Class location:** TUR 2319

### Instructor(s):

**Name:** Prof. Jamie Tayar

**Email:** [jtayar@ufl.edu](mailto:jtayar@ufl.edu)

**Office Building/Number:** Bryant 320

**Office Hours:** TBD

### Teaching Assistant(s):

**Name:** Zoe Yates

**Email:** [zoeyates@ufl.edu](mailto:zoeyates@ufl.edu)

**Office Building/Number:** Bryant 416

**Office Hours:** TBD

**Name:** Alejandro Camazon Pinilla

**Email:** [acamazon@ufl.edu](mailto:acamazon@ufl.edu)

**Office Building/Number:** Bryant 405

**Office Hours:** N/A

## Course Description

Intensive introduction to the fundamental properties of the Milky Way and its system of satellite galaxies. Course is intended for astronomy majors and natural science students. Topics include the ages, chemical abundances and kinematics of field stars and star clusters, the properties of the interstellar medium and its role in star formation, the dark matter content and models of the Milky Way

You should expect this course to be split in to three subparts: stellar physics, stellar evolution, and the Milky Way Galaxy. As part of this course you will do projects using up-to-date data, software, and techniques, as well as read and critique recent journal articles in addition to more standard problem sets and worksheets.

## Prerequisites

Credits: 3; Prereq: AST 3018, AST 3019 and a working knowledge of calculus.

**General Education Designation:** none.

## Course Materials

- Course Page: <https://ufl.instructure.com/courses/548170>
- Access to a computer will be essential for this course.
- You will also want some way to take notes during class.
- No textbook is required for this class. You are welcome to consult any outside references including:
  - Pinsonneault & Ryden "Stellar Structure and Evolution" ISBN-13 978-1108857994
  - Kippenhahn & Weigert "Stellar Structure and Evolution" ISBN-13 978-3540580133
  - Binney & Merrifield "Galactic Astronomy" ISBN-13 978-0691025650

## **Materials will be available through the following means:**

Official communication will be via Canvas and email. You are welcome to use whatever tools you prefer to collaborate with your classmates.

**Materials Fee:** N/A

## **II. Course Goals**

### **Course Objectives**

In this course we will:

- Quantitatively examine the equations of stellar physics
- Describe the evolution of stars and their connections to planets, galaxies, and the ISM
- Explore the current understanding of the structure, kinematics, and evolution of our Milky Way Galaxy and Local Group

### **Student Learning Outcomes**

A student who successfully completes this course will be able to:

- use equations of stellar physics
- describe paths of stellar evolution
- connect stellar physics to galactic evolution
- read scientific papers about stars and the galaxy
- interact with up-to-date models and data

## **III. Graded Work**

### **Graded Components**

**Problem Sets (25%):** Expect 4 problem sets

**Projects (45%):** Expect 3 projects

**Paper Summaries (25%):** Expect 5 paper summaries.

**Worksheets (5%):** In class worksheets will also contribute to your grade

**TOTAL: 100%**

### **Grading Scale**

#### **Letter Grade Number Grade**

A	100-92.5
A-	92.4-89.5
B+	89.4-86.5
B	86.4-82.5
B-	82.4-79.5
C+	79.4-76.5
C	76.4-72.5
C-	72.4-69.5
D+	69.4-66.5
D	66.4-62.5
D-	62.4-59.5
E	59.4-0

*Note: A minimum grade of C is required to earn General Education credit.*

*Also, I reserve the right to curve the class to improve scores if the final score distribution is lower than I expect. This can only help your grades; I will not apply a curve to reduce your score below the raw score.*

#### IV. Preliminary Calendar

Date	Topic	Relevant Readings	Work Due (Tues)
Aug 22, 2025	Observational Properties	Pinsonneault & Ryden Ch. 1	Introduction Worksheet
Aug 25, 27, 29	Equations of Stellar Structure; Equations of State; Ionization	Pinsonneault & Ryden Ch. 2-3, Kippenhahn & Weigert Ch. 2-5, 14	
Sep 3, 5	Thermodynamics & Opacity; Convection	Pinsonneault & Ryden Ch 4 & 7	Problem Set 1
Sep 8, 10, 12	Atmospheres, Nuclear Burning	Pinsonneault & Ryden Ch. 5, Kippenhahn & Weigert Ch 10	Paper Summary 1
Sep 15, 17, 19	Nuclear Burning, Homology, Pre-Main-Sequence	Pinsonneault & Ryden Ch. 6.2, 6.3, Kippenhahn & Weigert Ch. 19, 20, 24	Problem Set 2
Sep. 22, 24, 26	Pre-Main-Sequence, Main Sequence	Pinsonneault & Ryden Ch 7	
Sep. 29, Oct. 1, 3	Binaries & Planets, Low-Mass Post-Main Sequence	Pinsonneault & Ryden Ch 6, 8, 12, Kippenhahn & Weigert Ch. 22, 32	Project 1
Oct 6, 8, 10	Pulsation, Rotation	Pinsonneault & Ryden Ch. 10, 11	Problem Set 3
Oct 13, 15	High Mass, Supernovae	Pinsonneault & Ryden Ch. 8, Kippenhahn & Weigert Ch 31	Paper Summary 2
Oct. 20, 22, 24	Transients, End Stages, White Dwarfs	Pinsonneault & Ryden Ch 9	Project 2
Oct. 27, 29, 31	Clusters, Stellar Populations	Possibly Binney & Merrifield Ch. 6	Paper Summary 3
Nov. 3, 5, 7	Interstellar Medium	Possibly Binney & Merrifield Ch. 8,9	Problem Set 4
Nov 10, 12, 14	Bulge, Disk & Halo	Possibly Binney & Merrifield Ch 10	Paper Summary 4
Nov 17, 19, 21	Dark Matter, Dwarf Galaxies	N/A	Project 3
Dec 1, 3	Local Group	N/A	Paper Summary 5

#### V. Procedure for Conflict Resolution

Any classroom issues, disagreements or grade disputes should be discussed first between the instructor and the student. If the problem cannot be resolved, please contact Dr. Desika Narayanan ([desika.narayanan@ufl.edu](mailto:desika.narayanan@ufl.edu), 352-294-1865). Be prepared to provide documentation of the problem, as well as all graded materials for the semester. Issues that cannot be resolved departmentally will be referred to the University Ombuds Office (<http://www.ombuds.ufl.edu>; 352-392-1308) or the Dean of Students Office (<http://www.dso.ufl.edu>; 352-392-1261).

#### VI. Extensions

During the semester you are allowed two free one week extensions, no special permission required. Please note at the top of the assignment if you are using Free Extension 1 or Free Extension 2. Requests for additional extensions must be submitted by email to the instructor. I reserve the right to take up to 10% off

for each undiscussed day late.

## **VII. Collaboration & Resources Policy**

During this course, you will be working through problems, and I strongly encourage you to do so in groups. It is fine to discuss ideas, and even look at each other's code and calculations, to look up online resources, and to consult published works related to the tasks. However, I expect everything written that you turn in to be **entirely in your own words** (not a classmate's, or ChatGPT's). I also expect you to understand and be able to explain everything you turn in, including the purpose of each line of code. I also expect ALL sources to be cited, and for a list of people you collaborated with on the assignment to appear at the top.

For paper summaries in particular, you are **NOT** allowed to use ChatGPT or any other generative AI to assist you in completing the assignment. If I become concerned about AI use, we will switch to requiring these paper summaries to be handwritten for the entire class. If I still suspect AI use, I will add a final exam to this class that will count as part of the paper summaries grade.

## **VII. Class Attendance and Participation**

Attendance is expected during lectures, and In Class Worksheets will be used to assess attendance, participation, and understanding. Lectures may be recorded and available using zoom so long as class attendance remains above 50% at all times. If you are not feeling well, please consider joining over zoom or wearing a mask and maintaining distance from others. You do not need to notify the instructor about missing a single class, but if you expect to be absent for an extended period of time, please contact me in advance.