

# AST 4300: GALACTIC ASTRONOMY

Fall 2023

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<b>Instructor:</b>	Prof. Jamie Tayar	<b>Time:</b>	MWF 1:55 PM–2:45 PM
<b>Email:</b>	<a href="mailto:jtayar@ufl.edu">jtayar@ufl.edu</a>	<b>Place:</b>	FLG 0245
		<b>Office Hours:</b>	TBD, BRT 320

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## Timing / Structure:

The plan is for this course to be taught in person. Should COVID or some other situation encourage a change, we will use Zoom. I am not opposed to having Zoom open while I am lecturing for people who are sick, out of town, etc., but I will not be focusing on making sure the zoom experience is good, and if it becomes a situation where I am regularly lecturing to an empty classroom, I will stop having the zoom.

## Course Pages:

1. <https://ufl.instructure.com/courses/490633>

## Communication:

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

## Office Hours:

Office hours will be available in person, or over Zoom. You may also email if you require assistance or need to meet at a time not during the usual office hours. Please include the course number in your email subject line.

## Materials:

Access to a computer will be essential for this course. You will also want some way to take notes during class. If any of this is an issue, please talk to the instructor.

## Main References:

No textbook is required for this class. For additional information, you are welcome to consult any outside references including:

- Pinsonneault & Ryden, “Stellar Structure and Evolution” , [link](#)
- Binney & Merrifield, “Galactic Astronomy”, [link](#)
- Kippenhahn & Weigert, “Stellar Structure and Evolution”, [link](#)

## Objectives: You will learn to:

- manipulate 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 real stellar models and data

### Grading Policy:

- Problem Sets (40%)
- Projects (30%)
- Paper Summaries (30%)

During the semester, you are allowed two free one week extensions- 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 full day late.

More information on grades and grading policies is here: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> and here <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Letter grades are:

Letter	Minimum	Letter	Minimum	Letter	Minimum%
		A	93	A-	90
B+	87	B	84	B-	80
C+	77	C	74	C-	70
D+	67	D	64	D-	60

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.

### Attendance

Attendance is expected during lectures. However, if you are not feeling well, please consider joining over zoom, or wearing a mask and maintaining distance from others. Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

### Students Requiring Accommodations

Formally, students with disabilities requesting accommodations should first register with the UF Disability Resource Center (352.392.8565) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodations. Students with disabilities should follow this procedure as early as possible in the semester. You may also come talk to the instructor about accommodations that will help you achieve the learning objectives in this course.

### Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from

GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### **Online Teaching Policy**

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate orally in class are agreeing to have their voices recorded. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

### **Class Demeanor**

Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and limit activities that can be distracting to other students. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

### **Materials and Supplies Fees**

There are no additional fees for this course.

### **University Honesty Policy**

UF students are bound by The Honor Pledge which states, ‘*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Student Honor Code. On all work submitted for credit by Students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”*’ The Honor Code ([link](#)) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TA in this class.

### **Collaboration Policy**

During this course, you will be working through problems, and I 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 resources online, 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), with ALL sources referenced cited. I also expect that you have participated in working through and understand any calculations that you turn in. Some of the calculations you will do are relatively common, for those you are not allowed to look up the solutions online.

### **Coding Language**

For the projects especially, I will be expecting you to write code to analyze and display data. I am working under the assumption that most of you prefer to use Python, and I will sometimes make Jupyter notebooks in Python to make the assignment easier, but using Python is not a requirement. However, if you choose to use another language, I do not promise to be able to help you debug your code.

### **Counseling and Wellness Center**

Contact information for the Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Preliminary Schedule for Class Topics and due dates (subject to change)**

- Week 1 (Aug 23/25): // Observational Properties // Equations of Stellar Structure  
Due: Introduction Worksheet
- Week 2 (Aug 28/30/Sep 1): Equation of State // Ionization // Thermodynamics  
Due: Problem Set 1
- Week 3 (Sep 6/ Sep 8): Convection // Opacity  
Due: Paper Summary 1
- Week 4 (Sep 11/13/15): Atmospheres  
Due: Problem Set 2
- Week 5 (Sep 18/20/22): Nuclear Burning  
Due: Project 1- Stellar Modeling
- Week 6 (Sep 25/27/29): Homology // Polytropes  
Due: Paper Summary 2
- Week 8 (Oct 2/4): Pre-Main Sequence  
Due: Problem Set 3
- Week 8 (Oct 9/11/13): Low-Mass Stars Main Sequence // Post-Main Sequence  
Due: Nothing
- Week 9 (Oct 16/18/20) : High-Mass Stars Main Sequence // Post-Main Sequence  
Due: Problem Set 4
- Week 10 (Oct 23/25/27): End Stages  
Due: Project 2- Leavitt's Footsteps
- Week 11 (Oct 30/ Nov 1/3): Rotation // Pulsation  
Due: Paper Summary 3
- Week 12 (Nov 6/8): Binaries // Clusters  
Due: Problem Set 5
- Week 13 (Nov 13/15/17): Stellar Populations // ISM  
Due: Paper Summary 4
- Week 14 (Nov 20): History  
Due: Nothing
- Week 15 (Nov 27/29/Dec 1): Disks // Bulge // Halo  
Due: APOGEE's Galaxy
- Week 16 (Dec 4/6): Dwarf Galaxies // Local Group  
Due: Paper Summary 5