ASTR 221 — Stars and Planets

Time:	Mondays & Wednesdays, 12:45 pm - 2:00 pm		
Place:	Sears Library 552 (the "Astronomy Classroom")		
Instructor:	Bill Janesh bfj2@case.edu	**TA:**	Ray Garner crg56@case.edu
Course Webpage:	***http://astroweb.case.edu/bjanesh/astr221/ & Canvas for announcements and grades***		
Required Text:	***Foundations of Astrophysics*, by Ryden and Peterson (ISBN 978-1-108-83195-6)**		
Other Useful Books:	*Astronomy: A Physical Perspective, 2e,* by Kutner *Introduction to Modern Astrophysics, 2e*, by Carroll and Ostlie		

Grades:	Homework:	**45%**	*We will use the CWRU Standard Grading Scheme*
	Midterm:	**25%**	*(A≥90% | B≥80% | C≥70% | D≥60% | etc.)*
	Final Exam:	**30%**	

Course Description: Stellar structure and energy production. Formation and evolution of stars. Supernovae, neutron stars, and black holes. Star clusters. Planetary systems and the detection of extrasolar planets. The application of physical laws to the study of the universe.

Disability Accommodations: In accordance with federal law, if you have a documented disability, you may be eligible to request accommodations from Disability Resources. In order to be considered for accommodations you must first register with the Disability Resources office. Please contact their office at 216.368.5230 to register or get more information on how to begin the process. Keep in mind that accommodations are not retroactive.

Homework: There will be a total of **6** homework assignments. Collaborative discussion is permitted and encouraged, but **each person must turn in their own solutions with unique writeup/analysis**. Collaborative means talking with each other about approaches, techniques, etc., and *not* swapping final solutions to copy! **Submissions will be accepted on paper or in PDF format via Canvas.** Write-ups should be typed or *neatly* handwritten. For PDF submissions, scan your handwritten work properly (see homework tips page for suggestions) and please make an effort to merge all parts into a single file for submission. **Homework will generally be due in class** but see each assignment for specifics.

Exams: There will be one midterm and one final exam. **You are allowed one sheet of letter/A4-sized paper with notes on both sides,** but exam questions will ask you to synthesize information from what you know, not just work a problem or cite facts. You **may not** work collaboratively with your classmates, and I'll only answer clarifying or format questions. The final exam is scheduled for 12/15 from 12-3pm, please register any time conflicts with Undergraduate Studies. *Academic integrity violations during an exam will result in, at minimum, the failure of the exam.*

Attendance/Late Policy: *Attendance:* you are **encouraged, but not required, to attend lectures**. I will be recording class audio, which will be posted on the course webpage along with slides and notes. *Late work:* **You get one free no excuse late homework (up to one week). All other late work loses 20% per day.** If you have an emergency or otherwise legitimate reason out of your control for missing a homework due date (illness, technology issues, etc.), please document this with your Navigator and me ASAP. We'll then work out an alternate due date without penalty.

Computing: Some HW assignments will **require you to write and run code in Python** to solve astronomical problems. Don't worry — we'll spend at least one class getting more familiar with Python before I ask you to use it, but **ask for help if you need it**. Typed reports can easily be created using a Jupyter notebook, showing formatted text alongside code and math. *If you would like access to departmental computing resources, or have questions or concerns about this aspect of the course, please let me know as soon as possible.*

Office Hours: Mondays and Wednesdays the hour after class ends, and a 90 minute block on Thursday decided by class popular vote, or just drop in! Some questions can probably be answered via email; I will do my best to respond as soon as possible during normal business hours. If you have a question in person, please come prepared — for homework questions, you must attempt the problem on your own first! I will ask you to show me what you've tried before I answer questions. If you're not sure where to start, see the homework tips page.

	Date	General Topic	*Ryden & Peterson* Readings	Due
Week 1	*Aug 23*	Introductions; Orbits and Kepler's Laws	2.3, 2.5, 3.1	
	Aug 25	Orbits and Kepler's Laws; Gravity; Tides	3.1-3.4, 4.2, 4.3	
Week 2	*Aug 30*	The Sky; Constellations	1.3-1.6, 2.1, 2.2	
	Sept 1	Celestial Sphere; Coordinate Systems	1.1, 1.2	
Week 3	*Sept 6*	Labor Day (no class)		
	Sept 8	Light; Radiation; Blackbodies; Spectra	5.1-5.7	HW1
Week 4	*Sept 13*	Astronomical Techniques; Telescopes	6.1-6.7	
	Sept 15	Python Introduction	bring a computer!	
Week 5	*Sept 20*	The Sun; Hydrostatic Equilibrium	7.1-7.3, 14.1	
	Sept 22	Distances, Magnitudes, Colors	13.1-13.2	HW2
Week 6	*Sept 27*	Spectral Types; The H-R Diagram	13.3-13.6, 14.2-14.4	
	Sept 29	Velocities; Binary Stars; Stellar Masses	13.5	
Week 7	*Oct 4*	Nuclear Fusion; Energy Transport in Stars	15.1-15.4	
	Oct 6	Low Mass Stellar Evolution	17.2	HW3
Week 8	*Oct 11*	Review!		
	Oct 13	Midterm Exam	don't forget your notes sheet!	
Week 9	*Oct 18*	Fall Break (no class)		
	Oct 20	High Mass Stellar Evolution; Supernovae	17.3	
Week 10	*Oct 25*	White Dwarfs, Neutron Stars, Black Holes	18.1-18.4	
	Oct 27	Star Clusters	14.2-14.4, 17.2, 17.3	HW4
Week 11	*Nov 1*	Interstellar Medium; Star Formation	16.1-16.3, 17.1	
	Nov 3	Star Formation	17.1	
Week 12	*Nov 8*	Solar System Formation	8.1-8.3, 12.2	
	Nov 10	The Earth and Moon	9.1-9.5	HW5
Week 13	*Nov 15*	Rocky Planets; Interior Processes	10.1	
	Nov 17	Moons; Comets; Asteroids; Tiny Things	11.1-11.4	
Week 14	*Nov 22*	Atmospheres; Gas Giants	10.2-10.3, 9.2	
	Nov 24	Gas Giants	10.2-10.3	
Week 15	*Nov 29*	Exoplanets	12.3-12.4	
	Dec 1	Exoplanets	12.3-12.4	HW6
	Dec 15	Final Exam 12-3pm	don't forget your notes sheet!	