

# ASTRONOMY 206

## STARS AND STELLAR SYSTEMS

Spring 2021

Section 1

**Instructor:** Dr. Sebastian Zamfir  
B-205 SCI Bldg.(normal circumstances)  
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### ASTR 206 - Stars and Stellar Systems

**Description:**

Examine content and evolution of the universe, including birth and death of stars, nature of galaxies, and mystery of quasars and black holes, with emphasis on understanding physical concepts. 3 hrs lec, 3 hrs lab per wk, some night observations.

**Prerequisites:**

MATH 95 or suitable placement score, or Department Consent

**General Education Designation(s):**

GEP: NSC; AAS: LS, NW

4 cr.

**Delivery Format:** HYBRID

**LECTURES & LABS EXERCISES: ONLINE ASYNCHRONOUS**

OCCASIONAL PLANETARIUM IN-PERSON EVENTS: one-hour planetarium sessions in cohorts might happen this semester. Such visits will be regarded as optional. They will be scheduled on selected Thursdays, during 12:00 – 2:50 PM time interval.

**Office Hours:** By appointment. Send me an email and I will be happy to schedule a Zoom meeting with you ASAP.

Weekly Zoom Helping Session: I will host a one-hour Zoom session every week on Monday 11-12, open to the whole class. You will receive an invitation/reminder in email prior to that. You need not confirm your participation ahead of time. If you need help with any course-related topics, please don't hesitate to drop in.

**Textbook:** *21<sup>st</sup> Century Astronomy – Stars and Galaxies (6<sup>th</sup> Ed.)* by Kay, Palen & Blumenthal

**Other required** materials: A portable **scientific calculator** (graphing capabilities not needed)

**CANVAS Course website:** <https://uwstp.instructure.com/courses/374893>

Log on using your UWSP login and password. ***This website will be used for posting grades, lecture and lab notes, homework assignments, study guides, discussion sessions, exams, projects, etc. It is the main hub-interface for this course.***

**Learning Outcomes** – Upon completing this course, students will be able to:

- 1) Develop a sense of scale in space and time pertinent to the universe as a system.
- 2) Explain major concepts, methods, or theories used in the natural sciences to investigate the stars, galaxies, and larger structures in the universe.

- 3) Interpret information, solve problems, and make predictions/decisions by applying natural science concepts, methods, and quantitative techniques.
- 4) Understand the fundamentals of stellar physics and describe its relevance to our lives and society.

**Grading Policies:**

You will have the following contribution to your final grade:

**Laboratory work 20%**

**Three midterm exams each 15% (45% combined)**

**Final exam 20%**

**Homework 10%**

**CANVAS Discussions 2%**

**Star project 3%**

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**Total: 100%**

Your current grades will be kept updated as often as possible on CANVAS. If you have any questions/confusions on the listed grades, please contact me immediately so any errors can be corrected.

The final letter grade will be assigned according to the following scale:

A → 93-100%			A- → 90-92.99%		
B+ → 87-89.99%	B → 83-86.99%	B- → 80-82.99%			
C+ → 77-79.99%	C → 73-76.99%	C- → 70-72.99%			
D+ → 67-69.99%		D → 60-66.99%			
F → less than 60%					

**Lecture:** I will post recorded video-lectures for each section/topic of each chapter covered in the course. You are expected to watch them and take notes as needed. They are the equivalent of the three regular/classroom weekly lectures, each of 50 min.

**Laboratory:** The laboratory is an integral part of the Astronomy 206 course. A missed lab will automatically bring a zero contribution to the corresponding lab grade. All labs contribute equally, towards the final grade, with an overall 20% contribution. Failing the lab component of the class (i.e., scoring below 60%) will automatically result in a failing grade for the ENTIRE Astr206 course. All labs will be on CANVAS. There will be a deadline for each lab, about one per week. The lowest lab score will be dropped at the end of the semester. Students will submit individual lab reports via CANVAS, following provided instructions. Each lab is the equivalent of a regular 3-hour in-person lab.

**Midterm Exams:** There will be three midterm exams during the semester. They will be on-line, on CANVAS. There will be specific dates selected for a midterm exam. An exam will be available for a full 24 hours before closing. You may take it at any time within the 24-hour period. However, once you start working on it, the timer will start and will only allow you 60 minutes of uninterrupted work. It will be a single one-hour, uninterruptible time-window. Each midterm is worth 15% of your final grade and is based on the material covered in lecture, labs, and homework over the past weeks. Each midterm will cover a distinct segment of the overall material.

**Final exam:** A comprehensive final exam will be given during finals week. It is worth 20% of your final grade. The final exam will be on-line, on CANVAS. It will be available for the full 24 hours the day it is scheduled. Again, you can decide to start at any time within the 24-hour window, but you must work on it continuously for 2-hours. If you start at 11PM, you will be left with only one hour, as the 24-window closes at midnight.

**Note:** The lowest grade of the three midterm examinations can be replaced by the grade of the final exam (preserving the predefined contribution of 15%). This can be done only if the final exam grade is higher than the lowest grade of all three midterms. However, if you miss a midterm, this rule does not apply (a zero will not get replaced by a grade equal to that of the final exam!!!). Only one midterm grade can be replaced!

**Homework:** I will post a homework assignment on the course website just about every week. I will clearly announce when the homework is available on the website and emphasize the due date. Homework assignments will be submitted online by the due date/time. No homework will be accepted after the indicated due date/time. The lowest grade of all homework assignments will be dropped. All homework will account for 10% of your final grade.

**CANVAS Discussions:** There will be occasional Discussions on CANVAS, with specific/focused topics. Students are expected to contribute within the time window indicated, using decent, respectful words. Students are expected to use full, clear sentences. Please stay on the topic. You will only see your classmates' comments after you will have submitted yours. Participation in the discussion sessions will bring a max of 2% toward the final grade. Any inappropriate comments will result in removing the student from the discussions from that point forward and the loss of corresponding discussion points.

**Star project:** You will be assigned later in the semester a project about a star. It is worth 3% of your final grade. Each student will be given the name of a star and will be asked to gather various pieces of information about it. The project will be assigned only after we'll have introduced and explained several specific, fundamental topics about stars. Detailed information will be provided when the assignment will be handed out. It will be due by the end of our last week of regular classes, i.e., the week of May 10-14.

**Absences due to Military Service:**

You will not be penalized for class absence due to unavoidable or legitimate required military obligations, or medical appointments at a VA facility, not to exceed two (2) weeks unless special permission is granted by the instructor. You are responsible for notifying faculty members of such circumstances as far in advance as possible and for providing documentation to the Office of the Dean of Students to verify the reason for the absence. The faculty member is responsible to provide reasonable accommodations or opportunities to make up exams or other course assignments that have an impact on the course grade. For absences due to being deployed for active duty, please refer to the Military Call-Up Instructions for Students:

<https://www.uwsp.edu/veteran-services/Pages/Call-Up-Guidelines.aspx>

**Equal Access for Students with Disabilities:**

Students with special needs should contact the Office of Disability Services as soon as possible (<http://www.uwsp.edu/disability/Pages/default.aspx>) in order to request suitable accommodation. UW-Stevens Point will modify academic program requirements as necessary to ensure that they do not discriminate against qualified applicants or students with disabilities. The modifications should not affect the substance of educational programs or compromise academic standards; nor should they intrude upon academic freedom. Examinations or other procedures used for evaluating students' academic achievements may be adapted. The results of such evaluation must demonstrate the student's achievement in the academic activity, rather than describe his/her disability.

*If modifications are required due to a disability, please inform the instructor and contact the Disability and Assistive Technology Center to complete an Accommodations Request form. Phone: 346-3365 or Room 609 Albertson Hall.*

**Religious Beliefs Accommodation**

It is UW System policy to reasonably accommodate your sincerely held religious beliefs with respect to all examinations and other academic requirements.

You will be permitted to make up an exam or other academic requirement at another time or by an alternative method, without any prejudicial effect, if:

- There is a scheduling conflict between your sincerely held religious beliefs and taking the exam or meeting the academic requirements; and
- You have notified your instructor within the first three weeks of the beginning of classes (first week of summer or interim courses) of the specific days or dates that you will request relief from an examination or academic requirement.

**Academic Honesty: Students are expected to maintain the highest standards of academic integrity.** Common examples of misconduct include but are not limited to: copying the homework from others, looking at notes while taking an exam, talking to others while taking an exam. Just to avoid the embarrassment and severe consequences of misconduct it is strongly advised that if you need some clarification during an exam or while working on homework, you should ask the instructor/proctor for help. More information on your rights and responsibilities are available at: [http://docs.legis.wisconsin.gov/code/admin\\_code/uws/14.pdf](http://docs.legis.wisconsin.gov/code/admin_code/uws/14.pdf)

**UWSP 14.01 Statement of principles**

The board of regents, administrators, faculty, academic staff and students of the University of Wisconsin system believe that academic honesty and integrity are fundamental to the mission of higher education and of the University of Wisconsin system. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors.

**UWSP 14.03 Academic misconduct subject to disciplinary action.**

Academic misconduct is an act in which a student:

- (a) Seeks to claim credit for the work or efforts of another without authorization or citation;
- (b) Uses unauthorized materials or fabricated data in any academic exercise;
- (c) Forges or falsifies academic documents or records;
- (d) Intentionally impedes or damages the academic work of others;
- (e) Engages in conduct aimed at making false representation of a student's academic performance; or
- (f) Assists other students in any of these acts.

**Help Resources**

Tutoring	Advising	Safety and General Support	Health
Tutoring and Learning Center helps with Study Skills, Writing, Technology, Math, & Science. 018 Albertson Hall, ext 3568	Academic and Career Advising Center, 320 Albertson Hall, ext 3226	Dean of Students Office, 212 Old Main, ext. 2611	Counseling Center, Delzell Hall, ext. 3553. Health Care, Delzell Hall, ext. 4646

**UWSP Service Desk**

The Office of Information Technology (IT) provides a Service Desk to assist students with connecting to the Campus Network, virus and spyware removal, file recovery, equipment loan, and computer repair. You can contact the Service Desk via email at [techhelp@uwsp.edu](mailto:techhelp@uwsp.edu) or at (715) 346-4357 (HELP) or visit: <https://www.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx>

*All lecture materials and video-recordings for Astr206 are protected intellectual property at UW-Stevens Point. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my*

permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or share lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

**Tentative Sequence of Big Topics (a.k.a. Chapters):**

Thinking Like an Astronomer (Science and the Universe: A Brief Tour)	Evolution of Low Mass Stars	Galaxies
Our Star – The Sun	Evolution of High Mass Stars	The Expanding Universe
Taking the Measure of Stars	Relativity and Black Holes	Cosmology
The Interstellar Medium and Star Formation	Milky Way – A Normal Spiral Galaxy	Large Scale Structure of the Universe
<b>Midterm 1</b> (Friday, February 19)	<b>MIDTERM 2</b> (Thursday, March 18)	<b>MIDTERM 3</b> (Friday, April 23)

**FINAL EXAM (ON CANVAS) – Week of May 17 - 21 – 2hr. – CUMULATIVE, COMPREHENSIVE**

**Tentative List of Laboratory Exercises (order and titles may change at any time):**

Stargazing
Stars, Constellations, and the Astronomical Zodiac
Measuring the Mass of the Black Hole at the Core of Milky Way Galaxy
Light & Spectroscopy
Sun – General Properties
Taking the Measure of Stars
Introducing the Hertzsprung-Russell Diagram
Eclipsing Binary Stars
Measuring the Age of and Distances to Stellar Clusters
Nebulae Video
The Distance to Galaxy M100 Determined with Cepheid Variable Stars
Radio Astronomy of Pulsars
Morphology of Galaxies
Hubble – Lemaître Law