

ASTRONOMY 206

STARS AND STELLAR SYSTEMS

Spring 2022

Section 1

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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.

Meeting rooms/times:

Lecture (A113 SCI): Monday, Wednesday, and Friday 1:00-1:50 p.m.

Lab (B204 SCI): Monday 2:00 – 4:50 p.m.

Office Hours:

I have scheduled five office hours weekly:

Tuesday	02:00 – 04:00 p.m.
Wednesday	02:00 – 03:00 p.m.
Thursday	02:00 – 04:00 p.m.

(or anytime my office door is open)

The purpose of the office hours is to allow students to stop by my office and ask any kind of questions related to Astr206 (lectures, labs, homework, exams, etc.) or Astronomy in general. If your schedule conflicts with all listed time intervals, I am also available by appointment; you would have to send me an email or call me and we decide accordingly.

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

Other required materials: A portable **scientific calculator** (graphing capabilities not needed) and a **clicker** for in-class exercises/questions (details below).

Course website: <https://uwsa.instructure.com/courses/480468>

Log on using your UWSP login and password. ***This website may be used for posting grades, lecture and lab notes, homework assignments, study guides, and, very importantly, class announcements; for example, change of due dates for assignments, comments on a homework problem, etc.***

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.

Attendance:

Lecture attendance is **strongly recommended**. It is extremely important to an effective learning process. Although the lecture slides are available on the course website, they are not necessarily complete. They are meant only as an outline of a subject. Not everything we talk about in the classroom is on the slides and what is on the slides is not always self-explanatory. Attending class will likely be the single most important factor in determining your performance and grade in the course, so plan to attend every class. The relationship between attendance and achievement in education has been extensively documented in peer-reviewed research. **The material cannot be re-taught to you if you are absent, but you can ask a classmate to share notes. I will also post a selection of slides on CANVAS.**

Laboratory attendance is **mandatory**. 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. **Failing the lab component of the class (i.e., scoring below 60%) will result in a failing grade for the entire Astr206 course.**

In case of potential time conflict between a scheduled exam or a lab and religious observances, the student must bring this to the instructor's attention within the first three weeks of the semester, according to the UWSP policy.

Attendance Policy --- <https://www.uwsp.edu/regrec/Pages/Attendance-Policy.aspx>

If you decide to drop a class, please do so using accesSPoint or visit the Office of the Registrar. Changes in class enrollment will impact your tuition and fee balance, financial aid award and veterans educational benefit.

To meet the compliance reporting we ask that you take attendance during the first class meeting. **Any student reported as "Never Attended" (given an F0 grade in the First Week Attendance roster) will be notified by our office.**

During the first eight days of the regular 16 week term, your instructor will take attendance. If you are not in attendance, you may be dropped from the class. Failure to attend a course is not a guarantee that you will be administratively dropped. It is your responsibility to drop any course(s) that you are not attending or you will be held financially responsible for them.

If you must be absent during the term, tell your instructor prior to the class you will miss. If you cannot reach your instructor(s) in an emergency, contact the Dean of Students Office at 715-346-2611 or DOS@uwsp.edu .

If you are dropped from a class due to non-attendance, you may only be reinstated to the class section using the class add process. Reinstatement to the same section or course is not guaranteed. Your instructors will explain their specific attendance policies to be followed at the beginning of each course.

If you take part in an off-campus trip by an authorized university group such as an athletic team, musical or dramatic organization, or a class, make appropriate arrangements in advance with the instructor of each class you will miss. If you are absent from classes because of emergencies, off-

campus trips, illness, or the like, your instructors will give you a reasonable amount of help in making up the work you have missed.

If you enroll in a course and cannot begin attending until after classes have already started, you must first get permission from the department offering the course. Otherwise, you may be required to drop the course.

If you do not make satisfactory arrangements with your instructors regarding excessive absences, you may be dismissed. If you are dismissed from a class, you will receive an F in that course. If you are dismissed from the University, you will receive an F in all enrolled courses.

Grading Policies:

You will have the following contribution to your final grade:

Laboratory work 20%

Three midterm exams each 14%

Final exam 20%

Homework 10%

Observing project 2%

CANVAS Discussions 3%

Star project 3%

Total: 100%

Your current grades will be updated typically every week on the class website. If you have any questions about the grades or see any errors, please contact me immediately.

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%		

Laboratory work: The lab exercises are done in class. All labs account for 20% towards your final grade. You will be asked to work in groups of two. Each group will turn in a single lab report, hopefully the product of a constructive interaction between the members of the group. In order to get credit for lab work attendance is mandatory (I emphasize that one major objective of the lab is to allow you to develop group-working skills). All students signing the same lab report receive the same score in the gradebook for a given lab. You do not get any credit if you do not attend the lab. **The lab reports are due at the end of the laboratory class**, unless indicated otherwise by instructor.

The lowest lab grade will be dropped. If a lab is missed for any reason, that lab will be the one dropped when calculating the lab grade. Even if a lab is missed, the student is responsible for any material covered in that lab (for exams).

Midterm Exams: There will be **three** midterm exams during the semester. They will be given during the regular lecture time, as noted in the course outline (tentative schedule). The dates are subject to change; the exams will be announced in class at least week ahead of time. Each midterm exam is worth 14% of your final grade and is based on the material covered in lecture, labs and homework over the previous weeks.

Note: The lowest grade of the three midterm examinations can be replaced by the grade of the final exam (preserving the predefined contribution of 14%). This can be done only if

the final exam grade is greater than the lowest grade of all three midterms. However, if you miss a midterm without solid excuse, 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!

Final exam: A **comprehensive/cumulative** final exam will be given during finals week as noted in the course attached schedule. It is worth 20% of your final grade.

*There are no make-up exams. In the case of an unfortunate event (illness, death in the family, accident, etc.) please contact me **before the exam** (if at all possible) so that we could make proper arrangements. It is your responsibility to provide me with a valid doctor excuse for any illness that prevents you from fulfilling the requirements of this class.*

All scheduled exams will be “in-class” (no take-home exams) and they are all mandatory.

Homework: I will post a homework assignment on the course website every week. I will announce in classroom when the homework is available on the website and emphasize the due date. Homework assignments will be **submitted online** by the due date/time (see instructions later in this syllabus). **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.

Observing project: An observing project will be assigned at the beginning of the semester; it is worth 2% of your final grade; details are provided on the last page of the Syllabus.

Star project: You will be assigned later in the semester a project about a star. 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 (sometime in March). It will contribute 3% to 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 3% 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.

Suggestions for Studying:

1. Attend lecture and lab regularly.

The tests are predominantly based on lecture and lab material. If I have not lectured about a particular subject, it will not be on the test. I will often lecture around a picture or slide and you are responsible for material discussed in class even if it is not written out on the slide. The in-class bonus questions not only allow you to get bonus points, but they also offer you examples of questions reasonably similar to those that you'll see on exams.

2. Study regularly.

There is a lot of material covered, most of it probably a complete novelty. The course builds up sequentially and adds a substantial number of new terms to your vocabulary. It is more and more difficult to keep up with the flow of the course if you do not grasp the new concepts as they arise. Postponing study for the night before an exam rarely pays off.

3. Take advantage of the office hours.

Do not hesitate to ask me any kind of questions related to the lecture, labs, homework or any other subject related to Astronomy.

4. Try to attend actively. Take organized notes during lectures and try to keep your mind connected to the subject that is presented.

5. Find someone in the class to study with.

Get to know your classmates well enough so that you can ask for lecture notes, get together to study for exams, etc.

Final note: Common courtesy dictates that students attending a class should remain seated for the duration of class. While in class students should refrain from using phones, music players, headphones, etc. and should also refrain from gossiping/chatting while the professor is lecturing, and other students are listening and taking notes.

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 <https://www.uwsp.edu/finaid/veteran-services/Pages/default.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.

In case of emergency:

In the event of a medical emergency call 9-1-1 or use Red Emergency Phone. Offer assistance if trained and willing to do so. Guide emergency responders to victim.

In the event of a tornado warning, proceed to the lowest level interior room without window exposure. See www.uwsp.edu/rmgt/Pages/em/procedures/other/floor-plans.aspx for floor plans showing severe weather shelters on campus. Avoid wide-span structures (gyms, pools or large classrooms).

In the event of a fire alarm, evacuate the building in a calm manner. Meet at DUC. Notify instructor or emergency command personnel of any missing individuals.

Active Shooter/Code React – Run/Escape, Hide, Fight. If trapped hide, lock doors, turn off lights, spread out and remain quiet. Call 9-1-1 when it is safe to do so. Follow instructions of emergency responders.

See UW-Stevens Point Emergency Procedures at www.uwsp.edu/rmgt/Pages/em/procedures for details on all emergency response at UW-Stevens Point.

Academic Honesty: Students are expected to maintain the highest standards of academic integrity. More information on your rights and responsibilities are available at: 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 or at (715) 346-4357 (HELP) or visit: <https://www.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx>

Lecture materials and recordings for Astr205 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
Midterm 1 (Monday, February 21)	MIDTERM 2 (Wednesday, March 30)	MIDTERM 3 (Wednesday, April 27)

FINAL EXAM (in SCI A113) – Wednesday, May 18: 2:45-4:45 PM – 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

OBSERVING PROJECT

You will be required to visit the observatory on campus during the semester.

The observatory opens in the second week of the Spring semester. **When you go there identify yourself as being from Astr206.** The student(s) in charge will have you view **six** astronomical objects through the telescope. **There will be an observing report form available at the observatory. After viewing the objects, fill out the form (most of it will be completed at home, after your visit). The student(s) in charge will affix a stamp on your lab report for every object you observe through the eyepiece of the telescope. Return the complete observing project to me by the last scheduled day of lectures (May 13).**

The observatory is normally open Monday, Tuesday, and Wednesday evenings from 8:30-10:00 pm (please check the website http://www.uwsp.edu/physastr/plan_obs/Pages/observatory.aspx). If the skies are cloudy, the observatory will be closed and you need to go another time. The observatory can be contacted to determine if it will be open and has clear skies from any touch-tone phone by calling 346-2208 and selecting the observatory option (number 6) from the automated attendant. The announcement for the evening is usually not recorded until sometime after 7:30 pm since they do not want to close unless necessary.

I would advise you to go as early as possible since the weather is very unpredictable and I cannot guarantee that you'll have clear weather every Monday, Tuesday or Wednesday during the semester.

Location: The observatory is located on the roof of the Science building. You need to use the southwest stairwell in the Science building and go to the fourth floor, room D402. It is usually very cold in the observatory at night since the dome is open, so please dress appropriately.

You can also benefit from the Planetarium shows (the schedule is available at http://www.uwsp.edu/physastr/plan_obs/Pages/Public-Programs.aspx).