ASTRONOMY 206
STARS AND STELLAR SYSTEMS

Spring 2017
Section 1

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ASTR 206. Stars and Stellar Systems. 4 cr. 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. Prereq: MATH 100 or equiv. or cons chair. GDR: NS; GEP: NSC

Meeting rooms/times:
Lecture (A107 SCI): Monday, Tuesday and Thursday 2:00-2:50 p.m.
Lab (B204 SCI): Thursday 9:00 – 11:50 a.m.

Office Hours:
I have scheduled five office hours weekly:

Monday 12:00 – 02:00 p.m. Wednesday 12:00 – 02:00 p.m. Thursday 03:00 – 04:00 pm
(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 is in conflict 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 (5th 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: http://www.uwsp.edu/d2l/Pages/default.aspx
Log on using your UWSP login and password. ***This website will 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, exam dates, etc.***

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

1) Identify the basic principles of the scientific method as it pertains to the field of Astronomy in general, with a focus on formation and evolution of stars and galaxies.
2) Apply natural science concepts, quantitative techniques and methods to infer relationships, make predictions and solve problems based on analysis and interpretation of evidence and scientific information.
3) Describe the relevance of understanding the physics of stars and galaxies to your lives and to society.

Attendance:

Lecture attendance is strongly recommended. It is extremely important to an effective learning process. Although some lecture slides are available on the course website, they are not necessarily complete. They are meant only as an outline of a particular subject. Not everything that we talk about in classroom is on the slides and what is on the slides is not always self-explanatory. I will submit an attendance report to the registrar at the end of the second week of classes and constantly update the status of each student as we advance through the semester.

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

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 policy of the University.

Grading Policies:
You will have the following contribution to your final grade:
Laboratory work 20%
Three midterm exams each 15%
Final exam 20%
Homework 10%
Observing project 2%
Star project 3%

Your current grades will be posted periodically (updated typically every week) on the class website. If you have any questions about the grades listed 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%

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. 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). 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 15% 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 15%). 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, 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** 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** 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.*

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 (3%): 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).

Bonus questions using clickers: Questions will be asked periodically and you will answer using clickers (see below). All bonus questions will count **3%.** All answers will be rewarded, the incorrect ones getting partial credit.

Bonus points come on top of all other contributions. In other words, bonus questions can only boost, not lower your grade by any means.

This class uses "Clickers" to do interactive polling. You are required to lease a clicker for $8 for the semester, added to your UWSP Student ID bill. Clickers are available through Information Technology during the first two weeks of the semester. You need your UWSP Student ID to lease a clicker. Your clicker may be used in any class that requires clickers for the semester. Return your clicker before the end of finals. Students with unreturned clickers will be billed a late fee and/or may be billed the replacement cost of the clicker. You will receive email (reminders) toward the end of the semester reminding you of this return.

Useful info for students (about clickers):

http://www.uwsp.edu/infotech/Documents/Faculty%20Services/Clickers/FirstDayUsingClickers.pdf
http://www.uwsp.edu/infotech/Pages/techub/Clickers/Student-Clicker-Information.aspx

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 the 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.

Disability Services:

Students with special needs should contact the Office of Disability Services as soon as possible (https://www.uwsp.edu/disability/Pages/default.aspx) in order to request suitable accommodation.

Academic misconduct: Students are expected to maintain the highest standards of academic integrity. Common examples of misconduct: looking at notes while taking an exam, talking to others while taking an exam. Just to avoid the embarrassment of misconduct I would strongly advice that if you need some clarification during an exam you should ask the instructor/proctor for help. More information on your rights and responsibilities are available at: http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/Academic%20Integrity%20Brochure.pdf

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, head phones, etc. and should also refrain from gossiping/chatting while the professor is lecturing and other students are listening and taking notes.

In case of emergency: http://www.uwsp.edu/rmgt/Pages/em/procedures/default.aspx

Tentative Schedule

Week	Lecture topics	Textbook Chs.	Lab Ex.	HW
Jan 23-27	Why Learn Astronomy? Patterns in the Sky-Motions of Earth **(Observing Project explained)**	1, 2	Planetarium visit. The Stargazer	HW 1 begins Thursday, Jan 26
Jan 30-Feb 3	Motion of Astronomical Bodies Gravity and Orbits	3, 4	Planetarium visit. Intro to stars and constellations (Starry Night)	HW 1 due HW 2 begins Thursday, Feb 2
Feb 6-10	Light/Spectroscopy	5	Planetarium Visit. Measuring the Mass of the Black Hole at the center of Milky Way	HW 2 due HW 3 begins Thursday, Feb 9
Feb 13-17	The Tools of an Astronomer – Telescopes, Detectors and Instruments	6	Intro to Spectroscopy	HW 3 due HW 4 begins Thursday, Feb 16
Feb 20-24	Our Sun	14	Telescopes	HW 4 due HW 5 begins Thursday, Feb 23
Feb 27-Mar 3	**Midterm 1 (Monday, Feb 27)** Measuring the Properties of Stars HR Diagram	13	Sun – General Properties	HW 5 due HW 6 begins Thursday, Mar 2
Mar 6-10	Star Formation and the Interstellar Medium	15	Stellar Spectra	HW 6 due HW 7 begins Thursday, Mar 9
Mar 13-17	Low Mass Stars - Evolution	16	Intro to the HR Diagram	HW 7 due HW 8 begins Thursday, Mar 16
Mar 18-26	Vacation / Spring Break			No NW due
Mar 27-31	**Midterm 2 (Thursday, March 30)** High Mass Stars – Evolution	17	Eclipsing Binary Stars	HW 8 due HW 9 begins Thursday, Mar 30
Apr 3-7	Stellar Remnants	16, 17	Measuring Age and Distance for Stellar Clusters	HW 9 due HW 10 begins Thursday, Apr 6
Apr 10-14	Milky Way as an Island Universe	20	Nebulae Video	HW 10 due HW 11 begins Thursday, Apr 13
Apr 17-21	Galaxies	19	The Distance to Galaxy M100 Determined with Cepheid Variable Stars	HW 11 due HW 12 begins Thursday, Apr 20

Apr 24-28	Galaxies with Active Nuclei **MIDTERM 3 (Tuesday, Apr 27)**	19	Radio Astronomy of Pulsars	HW 12 due HW 13 begins Thursday, Apr 27
May 1-5	Our Expanding Universe Modern Cosmology	21, 22	Morphology of Galaxies	HW 13 due HW 14 begins Thursday, May 4
May 8-12	The Formation and Evolution of Galaxies/Large Scale Structures in the Universe **(Observing Project and Star Project due this week)**	23	Hubble Law **(Observing Project and Star Project due this week)**	HW 14 due Thursday, May 11
May 16	**FINAL EXAM** **Tuesday, May 16th 12:30-02:30 p.m.**	**Comprehensive/cumulative**		

Astr 206 ONLINE HOMEWORK INSTRUCTIONS

Here are a few general instructions about the homework. Please review these, but also read the instructions for the individual homework assignments on-line (whenever the case)

1. Homework assignments can be found at http://www.uwsp.edu/d2l/Pages/default.aspx and going to the QUIZZES section. The homework assignments have a specific due date.

2. The homework will be due at 10 P.M. on the date listed/announced. Time and due date are shown on the online listing of the homework. **No late homework will be accepted.**

3. Although you can do the homework multiple times for practice, **only the first attempt on the homework will be recorded and input into the gradebook.** Please make sure that it is your first attempt on the homework that you spend most time on.

4. Keep in mind that when you log into homework, you do not have to finish it during that session. As long as you just close down your browser or back out of that page without hitting the "Submit Quiz" button, you can always go back at another day or time to finish the homework. This allows you to look at the homework, and then come and ask me questions if needed prior to submitting the homework assignment. However, do not forget to hit "Submit" before the due date/time. Just saving the answers does not return a grade.

5. Please feel free to come and ask questions about the homework problems. I am happy to meet with you during office hours, before or after lab, etc. if you have questions prior to submitting your homework.

6. Do not put off your homework until the last minute. There are times when computers do not work, servers go down, etc. Plan ahead and start your homework early so that computer problems do not keep you from turning in your homework.

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 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 and have it signed by the student on duty, and return to me by the last scheduled day of lecture (see the tentative schedule above).**

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 absolutely 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).