

**SYLLABUS**  
**ASTR 203 (Lecture #002) Stars**  
**Spring 2015**

**LECTURES:** Tuesday/Thursday: 2:00 p.m. - 3:15 p.m.  
Steward Observatory, Room N210  
**(No Class on March 17 & 19, spring break. Last lecture May 5.)**

**INSTRUCTOR:** Dr. Nathan Smith  
**OFFICE:** Steward Observatory, room 336  
**TELEPHONE:** (520) 621-4513 (*voice messages are not checked regularly*)  
**EMAIL:** [profsmith170@gmail.com](mailto:profsmith170@gmail.com) (*this is the best way to contact Dr. Smith*)  
**OFFICE HOURS:** Tu/Th (11:00 a.m. - noon) or by appointment

**TEACHING ASSISTANT:** Justin Spilker  
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Office Hours: M (2:00-3:00 p.m.), W (11:00 a.m. - noon) or by appointment

**MIDTERM EXAMS:** Tuesday, February 10, 2:00 p.m.  
Tuesday, March 10, 2:00 p.m.  
Thursday, April 9, 2:00 p.m.

**FINAL EXAM:** Monday, May 11, 3:30 p.m. - 5:30 p.m., Steward Obs. N210

**REQUIRED TEXTBOOK:** *21<sup>st</sup> Century Astronomy – Stars and Galaxies*, 4<sup>th</sup> Edition,  
by Kay, Palen, Smith, & Blumenthal (Norton & Co)

**COURSE WEBSITES:** <http://D2L.arizona.edu> and <http://smartwork.wwnorton.com>

**COURSE OVERVIEW AND GOALS:** This course will focus on the properties of stars, their role in the universe, and their connection to our existence and daily lives. We will discuss some fundamentals of astronomy, physics, and matter, and then learn about the birth, life cycles, and deaths of various types of stars, as well as their impact on their galactic environment. This is an introductory level course intended for undergraduates who are not science majors. Broadly speaking, our learning goals below should be kept in mind as we cover factual and conceptual material during the semester. After completing this course, a student should be able to:

1. Explain the night sky to friends and family. Be familiar with the concepts associated with motions in the sky, the various physical properties of stars, and how they change with time. In this class we will not focus on the constellations or the mythology associated with them.

2. Develop a clear understanding of the scientific process of making observations of Nature, formulating theories to explain them quantitatively, making predictions, and then making new measurements to test those predictions in order to objectively verify or rule out a theory.

3. One of the coolest things to learn in astronomy is that we are all stardust (literally). Students should finish this course with a deep understanding of what this means, including the physical processes that connect the atoms in our bodies to previous generations of stars. This requires an understanding of the differences between high-mass and low-mass stars, and how they live and die.

## TOPIC SCHEDULE & READING/HOMEWORK ASSIGNMENTS:

(Assigned chapters must be read before class on Tuesday of the listed week)

<u>Week</u>	<u>Topic</u>	<u>Chapters</u>	<u>Assignments/Exams</u>
Jan 15	Introduction/overview/basics	...	...
Jan 20/22	History, Scientific Method, The Sky	1, 2	HW1 (Th), planetarium (Th)
Jan 27/29	Greeks/Copernicus, Orbits, Gravity	3, 4	HW2 (Th)
Feb 3/5	Light, Matter, Spectroscopy, Telescopes	5, 6	HW3 (Th)
Feb 10/12	Normal Stars	13	Midterm 1 (T)
Feb 17/19	Normal Stars, Binary Stars, HR Diagram	13	HW4 (Th)
Feb 24/26	The Sun, Energy	14	HW5 (Th)
Mar 3/5	Evolution of Low-mass Stars	16	HW6 (Th)
Mar 10/12	White Dwarfs, Novae, Supernovae	16	Midterm 2 (T)
Mar 17/19	<b>No Class - SPRING BREAK</b>		
Mar 24/26	Evolution of High-mass Stars	17	HW7 (Th)
Mar 31/Apr 2	Stellar Death, Neutron Stars	17, 18	Term Paper 1 <sup>st</sup> Draft (Th)
Apr 7/9	Black Holes, Relativity	18	Midterm 3 (Th)
Apr 14/16	ISM, Star Formation	15	HW8 (Th)
Apr 21/23	Solar System Formation, Exoplanets	7	HW9 (Th)
Apr 28/30	Stars in Other Galaxies, The Milky Way	20, 21	Final Term Paper (T), HW10 (Th)
May 5	Summary/review		
May 11	<b>Final Exam 3:30-5:30 pm</b>		

**GRADING:** Your final grade for the course will be based on the midterm/final exams and other assignments in the following proportion (total possible = 800 points):

Homework	160 points (20%)
Participation/Team Score	80 points (10%)
Term Paper	120 points (15%)
Midterm 1 (1 of 3)	120 points (15%)
Midterm 2 (2 of 3)	120 points (15%)
Midterm 3 (lowest of 3)	dropped
Final	200 points (25%)
Extra Credit	20 points (maximum - bonus)

The final letter grade that will appear on your transcript will be determined by *cumulative* points you earn in the class, evaluated on a curve compared to the entire class. Letter grades will not be given for each individual assignment, but in class we will give feedback (i.e. a representative grade curve) for large-value items like mid-term exams and the term paper. We cannot give a representative grade for participation scores and presentations, as those are accumulated throughout the semester and the curve can only be determined at the end. If you would like feedback on your homework assignments, please come to office hours or schedule an appointment with your TA or Prof. Smith. Mistakes in grading individual assignments sometimes happen. All questions, disputes, or mistakes regarding the grading of exams and assignments must be brought to our attention within 1 week after the assignment is handed back or posted; such checks are encouraged.

**HOMEWORK:** This course requires weekly online homework (details at end of syllabus) that will involve questions from the assigned reading and online activities. You may discuss the concepts with classmates, but you must do your own work. Each will count for 20 points, and we will drop the two lowest homework scores. Dropping these two scores is meant to allow flexibility for any unforeseen disasters, illnesses, family emergencies, religious holidays, sporting events, late registration in the course, the bookstore running out of books, computer malfunctions, zombie attacks, etc. For this reason, late homework will **not** be accepted...ever. Do not request the opportunity to make up homework unless your reason is serious enough (i.e. a prolonged severe illness) to warrant receiving a grade of incomplete in the course with a valid Dean's excuse.

**TERM PAPER WRITTEN ASSIGNMENT:** All students are required to submit a written project as part of the requirements for this course. The deadlines for turning in your term paper are Thursday, April 2 (first complete draft) and Tuesday, April 28 (final corrected version) – in both cases at 2:00 pm (start of class). These deadlines are essential to allow Prof. Smith and your TA to read all the term papers before the end of the semester, so **absolutely no late term papers will be accepted except for a medical emergency**. Please do not test us on this, or you will make yourself unhappy. Detailed instructions are available on D2L. Submit a *printed hardcopy* in class on the due date, and also upload a PDF file to the course website (D2L) dropbox before 2:00 pm. Failure to do either by the deadline will earn you a score of zero on this assignment.

**DEADLINES:** We will accept **no** late assignments. Term papers are to be submitted in class (hardcopy) and submitted online (PDF), and the electronic servers will not accept submission after the deadline. If you choose to wait until a few hours before the deadline to do your assignment, you are taking a calculated risk. Should your printer break, Internet go down, or any other emergency arise, these will not be valid excuses.

**MAKE-UP EXAM POLICY:** We do not give make-up exams. Instead, we will give 3 midterm exams and we will drop the lowest score, whether it is a zero due to an unavoidable absence or a lower score due to a less spectacular performance. Only your two best midterm scores will be counted. Also, please note that the final exam is scheduled for May 11. Take this into account when making any travel plans. Your desire to go home earlier than May 11 **will not** be accepted as a valid excuse. You are required to be here on May 11 or you will fail the course.

**TEAMS:** You will conduct some of your coursework in “teams”. We will aim for 5-7 people per team, but this will ultimately depend on the number of students enrolled, which may change throughout the semester as students add or drop the class. The purpose of this is to encourage you to discuss the course material, to help each other understand the material, and to add some variety to lectures. The types of in-class activities we do will vary, and will be announced in lecture. All students on a team will receive the same score for an activity (as long as they are present that day).

**LOOKING THROUGH A TELESCOPE:** This is not required, but you are encouraged to attend any of the series of public evening lectures hosted by Steward Observatory. See the listing at: <https://www.as.arizona.edu/public-evening-lecture-series> . Following all public lectures (which are held in this room, N210), the telescope dome outside this lecture hall will be open for viewing objects in the night sky (weather permitting). This telescope is also open for eyepiece observing every MTWTh during the semester. You must sign up in advance near the lobby.

**PLANETARIUM VISIT:** On Thursday Jan 22, report directly to the Flandrau Planetarium (other side of Cherry Ave.). Do not come to the normal lecture hall first.

**EXTRA CREDIT:** This course provides the opportunity to earn a maximum of 20 extra-credit points added to your total course points. You can attend any of the series of public evening lectures hosted by Steward Observatory, listed above. These are free and open to the public. You may earn 5 extra credit points for each lecture you attend, up to 20 points (you may attend all lectures, but you can only earn points for four of them). To earn the points, you submit a 1-page written report (PDF files only) on the course D2L website, including a basic summary of the lecture (about half a page), a more detailed discussion of one aspect of the topic that you found interesting (the rest of the page). These write-ups should be submitted within a week after the lecture, and by May 5 (last day of regular class) at the latest.

**PARTICIPATION IN CLASS:** Attendance may be taken at any lecture (but not every lecture) in the form of in-class exercises and will figure into your final grade. Students are responsible for all information given out in the lecture, including any announced schedule changes, and so attendance is *required*. If you must miss class, talk to another student, your instructors, or consult the D2L page to find out what you missed. We will conduct interactive group exercises in class; this will improve your understanding of the material and will count toward your grade. You will not be allowed to make up any missed participation points. To allow for unavoidable periodic absences, we allow two absences with no penalty. In other words, your two lowest participation scores will be dropped regardless of the reason.

**REQUIRED TEXT:** The textbook named above is required for the course. The syllabus lists which chapters in the text correspond to lecture topics each week, and assigned reading. You are required to read those chapters *before* coming to class that week. Most of the homework problems will be taken from this textbook, and in-class exercises will depend on the reading. Note that if you purchase a used copy of the book, you must also purchase access to the online SmartWork material from Norton (for about \$20). This online access is essential for your weekly homework.

**LEARNER-CENTERED EDUCATION:** The University of Arizona has designated itself a “Learner-Centered University.” This means that the student is expected to take an **active** role in his/her learning. Class time will be peppered with “mini-lectures” for qualitative understanding, separated by activities that will require your participation, especially team activities that will constitute part of your grade. Be prepared to interact with your classmates, ask questions, and participate in group discussions. Always read the relevant textbook chapters **BEFORE** coming to class. Students who actively participate in class are more likely to be bumped up if their final grade lands on a border, as compared to those who do not.

**TURNITIN.COM:** If you decide to continue in this course, you are agreeing to submit any papers online as PDF files, when so instructed, which will be examined by a plagiarism-prevention program called TurnItIn.com. You should note that TurnItIn.com – always without your name and any personal information – will retain your paper as part of their database so that students who plagiarize from it now or in the future can be detected. Because of this program, the vast majority of you who do your own work and cite your sources of information properly will not have to compete with students who commit plagiarism.

**ACADEMIC DISHONESTY:** Presentation of any work other than your own, in whole or in part, is considered academic dishonesty. This includes copying test answers or homework assignments, other persons taking exams or quizzes for you, plagiarism of any material on the Internet or in other publications, fabrication, borrowing another student's assignment as an "example", reference to any unauthorized materials during the exam, or turning in a project that you have previously submitted for another course. The only exception to this policy is work specifically designated as group work. In instances where nearly identical assignments are submitted, *all* parties will be held in violation of the Code of Academic Integrity, *so do not share your assignment with another student*. Any other technique that gains unfair advantage over other students is also academically dishonest. All students must be prepared to present valid picture ID if requested during any exam. Any incidents of academic dishonesty will be dealt with harshly according to the University of Arizona's Code of Academic Integrity: <http://deanofstudents.arizona.edu/codeofacademicintegrity> . The consequences can range from loss of credit on an assignment or automatic failure of the course, to full dismissal from the University, depending on the severity. In our class, the penalty for plagiarism, cheating on an exam, or homework fraud will be automatic failure of the course and, depending on the circumstances, expulsion from the University. It is not worth the risk.

**STUDENTS WITH DISABILITIES:** If you anticipate issues related to the format or requirements of this course, please meet with Prof. Smith. We would like to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Resources (621-3268; <http://drc.arizona.edu> ) and notify Prof. Smith of your eligibility for reasonable accommodations well in advance of the first midterm. We can then plan how best to coordinate your accommodations.

**BEHAVIOR IN CLASS:** NO smoking, eating, drinking (except water), or pets are allowed in the lecture hall. All cell phones must be turned to silent mode or powered off completely, and must be placed *completely out of sight*. To not interfere with students trying to listen to the lecture, you may not use a laptop in class except to take notes. If you intend to use a laptop in this manner, please sit toward the back or sides of the lecture hall to mitigate your screen from distracting those behind you. You are expected to be courteous and respectful to your classmates and instructors, and we ask that you strive to be inclusive in group exercises. You should also be aware of the University's policies on disruptive and threatening behavior:

<http://deanofstudents.arizona.edu/disruptiveandthreateningstudents>

**ACCESS TO THE ONLINE MATERIAL:** Access to the Norton SmartWork online material comes with your book if purchased from the UA bookstore. If you have a used copy, you must purchase the online access (about \$20) in order to complete the online homework. To set up your account, follow the "First Time User" instructions at <http://smartwork.wwnorton.com>

You will need:

1. A valid email address
2. The enrollment key for this course: ASTRO4E7577.
3. A registration code from W.W. Norton (with book purchase).

Students can buy standalone access to SmartWork, access Technical Support, and find answers to many FAQ's at <http://books.wwnorton.com/books/buysmartwork/>.