

PHYS 1311: Elements of Astronomy

Syllabus and Course Information

Instructor: Professor Krista Lynne Smith
Teaching Assistant: Alvin Leluc
Lecture times: 10:00 -10:50 AM Wed/Fri
Laboratory times: Monday 1:00 - 2:50 PM (N10)
Monday 3:00 - 4:50 PM (N11)
Location: FOSC 158

Professor's Contact Information:

Email: kristas@smu.edu
Office phone: (214) 768-9879
Office: FOSC 41
Office hours: Wednesday 1:30 – 2:30 PM or by appointment.

TA's Contact Information:

Email: aleluc@mail.smu.edu
Office hours: TBD

Course Objectives: In this class, you will learn both the basic physical phenomena of astronomy, from the planets and bodies in our solar system to quasars at the edge of the observable universe, as well as the methods used in modern observational astrophysics to study these objects. You should also get a sense of how the field of professional astronomy works, and what kind of instruments are used in astronomical experiments.

General Attendance Policy: You are expected to attend all lecture periods in person. Anticipated absences resulting from religious observance or officially sanctioned extracurricular activity must be brought to the instructor's attention at least 2 weeks in advance. In the case of unexpected absence due to illness or other circumstances, prompt communication with the professor is required to ensure your absence is excused and any accommodation for make-up work can be arranged. Lectures will be *recorded*, but will *not* have simultaneous Zoom access.

Missed or Late Assignments Policy: If you let the professor or TA know *in advance* that you will be unable to complete an assignment on time, you may make up the assignment by a later due date agreed upon by you and the professor. If you fail to turn in an assignment on time, you may make up the assignment by a later due date for up to 80% of the point value *if you notify the professor* that you wish to do this within 1 week of the missed assignment. Otherwise, no late work is accepted, and no extra credit work will be allowed at the end of the term.

COVID-19 Policies:

- **Attendance:** If you are ill, or have had a known or even a suspected exposure to COVID-19, let the professor know *as soon as possible* and we will work with you to accommodate access to recorded lectures and negotiated deadlines. **Do not come to class if you feel ill or if you worry you have been exposed to COVID-19!** Communicate your concern as soon as you are able, and we will work around it, we will be flexible, and you will not be penalized!

Grading: The majority of grading in the course will come from homework assignments, laboratory reports, and weekly online discussions. There will be one project and two exams. The percentage breakdowns are as follows:

- Class Discussion & Attendance	10%
- Homework:	25%
- Lab Reports:	20%
- Class project:	15%
- Mid-term exam:	15%
- Final exam:	15%

SPECIFIC COMPONENTS:

Class Discussion & Attendance: Each week we will have an in-class short writing prompt (on Wednesdays) and in-class discussion or practice activity (on Fridays). Turning these in gives you credit for attendance and participation in the activity. If you must be absent, refer to the attendance policy above.

Homework: Each week there will be one homework assignment worth ~10 points total. This will either be a quiz-style assignment or a short writing assignment based on lecture material or external videos or articles.

Lab Reports: Each weekly lab will be worth ~20 total points. The breakdown of the points is given on each lab description. If you miss a lab with an excused absence, you may make up a similar, virtual-only lab within 2 weeks of the initial lab date on your own time. It is your responsibility to request a make-up lab within this time frame.

Class Project: During our course you will complete a project with two checkpoints. The first two checkpoints will be worth 5 points each, and the final project will be worth 20 points total. The checkpoints should be viewed as opportunities for feedback on your project, so that you can improve it before the final submission.

Exams: the two exams will be a combination of multiple choice and short answer, and will be graded as denoted by each question on the exams.

Course Outline (subject to change):

Week 1: Scale of the Universe, The Big Questions, Astrology

Jan 17 - 20

Week 2: Coordinate systems, Telescopes across the Electromagnetic Spectrum

Jan 23 - 27

Week 3: The Solar System, Planets, Orbital Motion, Asteroids, the Moon

Jan 30 – Feb 3

Week 4: Exoplanets and How to Find Them, Formation of Planetary Systems

Feb 6 - 10

Week 5: Formation of the Solar System, Exoplanets and How to Find Them

Feb 13 – 17

Week 6: Spectroscopy, Doppler Effect, Radiation

Feb 20 - 24

Week 7: The Sun as a Star, Stellar Types, Stellar Evolution

Feb 27 – March 3

--MIDTERM EXAM: **During Lab Periods on Monday, March 6**

Week 8: Deaths of Stars, Black Holes, Neutron Stars, Pulsars

March 6 – 10 *First project checkpoint due Friday March 10*

SPRING BREAK: March 13 - 17

Week 9: The Milky Way and its Neighborhood, Globular Clusters, Dwarf Galaxies

Mar 20 – 24

Week 10: Galaxy Classification, Galaxy Evolution

Mar 27 – 31

Week 11: Quasars, Active Galaxies, Supermassive Black Holes

Apr 3 – 7 (No class on Good Friday, April 7)

Week 12: Cosmology, Cosmic Microwave Background, the Big Bang

Apr 10 – 14 **Second Project Checkpoint due Friday, April 14**

Week 13: Dark Matter, Fate of the Universe

Apr 17 – 21

Week 14: Special topics: Extraterrestrial Life, Astrobiology

Apr 24 – 28 *Final project report due Wednesday, April 26.*

Week 15 : Special topics, project presentations

May 1-2

--FINAL EXAM: Wednesday May 10 at 8 AM – 11 AM

If you are reading this before the midterm, thank you for studying your syllabus! Sometime before the midterm exam, choose a favorite image taken by the Hubble Space Telescope from the internet. Print it out and write what you find beautiful or inspiring about the image, then place it in my mailbox in the Physics office (FOSC 102/103) or slide it under my office door for 2 extra credit points on the midterm exam.

Learning Outcomes

The following Learning Outcomes from SMU's Common Curriculum will be addressed.

Critical reasoning: Students will demonstrate university-level critical reasoning proficiencies through written expression.

Supporting skills:

- Students will demonstrate an understanding of information literacy.
- Students will craft arguments using the critical reasoning skills developed throughout the course

Quantitative Reasoning: Students will demonstrate an ability to interpret mathematical models in the form of formulas, graphs, and/or tables and draw inferences from them.

Supporting skills:

- Students will interpret and translate between multiple different representations of information, such as visual, numerical, symbolic, and/or verbal representations.
- Students will use equations and/or principles to solve for an unknown quantity.
- Students will evaluate whether an argument is valid and/or reasonable.

Quantitative Applications: Students will demonstrate an ability to interpret mathematical models in the form of formulas, graphs, and/or tables and draw inferences from them in a specified domain.

Supporting skills:

- Students will select appropriate quantitative methods for domain-specific problems based on evaluation of assumptions for those methods.
- Students will apply the appropriate quantitative methods to solve domain-specific problems.

Exploring Science: Students will demonstrate an ability to engage in scientific inquiry with respect to the natural world.

Supporting skills:

- Students will identify and organize evidence necessary to analyze or solve a problem in the natural world.

- Students will describe and explain concepts that are needed to analyze or solve a problem of the natural world.
- Students will analyze the outcomes and consequences, given information about a natural phenomenon.

SMU Required Syllabus Statements

Disability Accommodations	Students who need academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit http://www.smu.edu/Provost/SASP/DASS to begin the process. Once they are registered and approved, students then submit a DASS Accommodation Letter through the electronic portal, <i>DASS Link</i> , and then communicate directly with each of their instructors to make appropriate arrangements. Please note that accommodations are not retroactive, but rather require advance notice in order to implement.
Sexual Harassment	All forms of sexual harassment, including sexual assault, dating violence, domestic violence and stalking, are violations of SMU's Title IX Sexual Harassment Policy and may also violate Texas law. Students who wish to file a complaint or to receive more information about the grievance process may contact Samantha Thomas, SMU's Title IX Coordinator, at accessequity@smu.edu or 214-768-3601. Please note that faculty are mandatory reporters. If students notify faculty of sexual harassment, faculty must report it to the Title IX Coordinator. For more information about sexual harassment, including resources available to assist students, please visit www.smu.edu/sexualmisconduct .
Pregnant and Parenting Students	Under Title IX, students who are pregnant or parenting may request academic adjustments by contacting Elsie Johnson (elsiej@smu.edu) in the Office of the Dean of Students, or by calling 214-768-4564. Students seeking assistance must schedule an appointment with their professors as early as possible, present a letter from the Office of the Dean of Students, and make appropriate arrangements. Please note that academic adjustments are not retroactive and, when feasible, require advance notice to implement.
Religious Observance	Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. Click here for a list of holidays.
COVID-19 and Other Medical-Related Absences	Students who test positive for COVID-19 and need to isolate, or who are notified of potential exposure, must follow SMU's Contact Tracing Protocol . To ensure academic continuity and avoid any course penalties, students should follow the same procedures described by their instructors as they would for any other medical-related absence in order to be provided with appropriate modifications to assignments, deadlines, and exams.
Excused Absences for University Extracurricular Activities	Students participating in an officially sanctioned, scheduled university extracurricular activity should be given the opportunity to make up class assignments or other graded assignments that were missed as a result of their participation. It is the responsibility of the student to make arrangements for make-up work with the instructor prior to any missed scheduled examinations or other missed assignments. (See 2020-2021 SMU Undergraduate Catalog under "Enrollment and Academic Records/Excused Absences.")

Final Exams	Final course examinations shall be given in all courses where appropriate, and some form of final assessment is essential. Final exams and assessments must be administered as specified in the official examination schedule. Exams cannot be administered or due during the last week of classes or during the Reading Period. Syllabi must state clearly the form of the final exam or assessment, and the due date and time must match the official SMU exam schedule. Final exams are not required to be provided online.
-------------	--

Student Support

Student Academic Success Programs	Students needing assistance with writing assignments for SMU courses may schedule an appointment with the Writing Center through Canvas. Students who would like support for subject-specific tutoring or success strategies should contact SASP, Loyd All Sports Center, Suite 202; 214-768-3648; https://www.smu.edu/sasp .
Caring Community Connections Program	CCC is a resource for anyone in the SMU community to refer students of concern to the Office of the Dean of Students. The online referral form can be found at smu.edu/deanofstudentsccc . After a referral form is submitted, students will be contacted to discuss the concern, strategize options, and be connected to appropriate resources. Anyone who is unclear about what steps to take if they have concerns about students should either consult the CCC Reference Guide or contact the Office of the Dean of Students at 214-768-4564.
Mental Health Resources: On-Call and On-going Counseling Services	Throughout the academic year, students may encounter different stressors or go through life experiences which impact their mental health and academic performance. Students who are in distress or have concerns about their mental health can schedule a same-day or next-day appointment to speak with a counselor by calling Counseling Services . Counselors are available at any time, day or night for students in crisis at this number: 214.768.2277 (then select option 2). They will be connected with a counselor immediately. Students seeking on-going counseling should call the same number: 214.768.2277 (then select option 1) during normal business hours to schedule an initial appointment.
Campus Carry Law	In accordance with Texas Senate Bill 11, also known as the ‘campus carry’ law, and following consultation with entire University community, SMU chooses to remain a weapons-free campus. Specifically, SMU prohibits possession of weapons (either openly or in a concealed manner) on campus. For more information, please see: http://www.smu.edu/BusinessFinance/Police/Weapons_Policy .