AST 103, FALL 2025
SKY & TELESCOPES

Meeting times: Monday, 7:00-10:00 pm
Wednesday, Thursday, & Sunday, 7:30-9:00 pm (make-up nights)

Instructor: Meg Lysaght Thacher (she/her)
McConnell 408* 413-585-3935 mthacher@smith.edu
Mon & Thu 2:00-3:30 pm *or by appointment*

Materials: *Stars and Planets* by Jay Pasachoff (Houghton Mifflin)
Calculator
Warm clothes: winter hat, mittens, coat, thermal underwear, wool socks
Flashlight

COURSE DESCRIPTION

In this 3-credit class, you will become an expert at finding your way around the night sky using your naked eye and a telescope—one of the oldest scientific instruments still in use. You'll also learn about the daily and annual motions of the Sun, Moon, stars, and planets, and will see the latest in digital imaging techniques.

Our class time will usually be split between two main activities: indoor lab exercises and outdoor observing. On cloudy nights, we may be indoors only, and on clear nights, outdoors only. Because some Mondays will be too cloudy to permit observing, we have also designated Tuesdays, Thursdays, and Sundays from 7:30 to 9:00 pm as makeup nights for any observing. Undergraduate teaching assistants (TAs) will be available on those nights. In addition to our regular Monday class period, all students **must** have at least one (preferably two) of these three evenings free, in order to complete the nighttime observing. The TAs are also available to help students finish or make up lab work.

I have tried to make this course accessible to all students, without extra accommodation. However, if you have an accommodation letter from the Office of Disability Services, please do share it with me. All material in this course is easily adapted, and I'm happy to do so. If you need anything from me in order to facilitate your success in this course, please ask! I want all students to be engaged and learning.

ATTENDANCE POLICY

It is important to attend all classes. We only meet once per week, and material covered in labs depends on material from the previous classes. If you are absent from class, please complete the lab within 2 weeks of its original due date. It is best if you miss no more than two labs.

If you are experiencing difficulties in attending class or turning in work on time, please contact me *and* your class dean. We will work together to support you in completing all work in a timely manner.

* in the stairwell!

CLASS SCHEDULE

*Subject to change. **Always** check Moodle page for updated schedule and assignments.*

Date	Topic	***Reading assignment*/homework**
Unit 1: Telescope Operation		
Sep 8 *WnG*	*Constellations* Introduction to Telescopes	
Sep 15 *WnC*	*Telescope Operation* Angular Size	*Stars & Planets chs. 1−4* Stars & Constellations I
Sep 22 *NM*	*Independent Observing* Angular Measure	**Sky Quiz due** Stars & Constellations II
Unit 2: Stellar Motions		
Sep 29 *FQ*	*Independent Observing*	*S&P ch. 15* *Binocular manual* *Eclipses*
Oct 6 *FM*	*Using Telescopes on the Permanent Piers* Daily Motion & Coordinates Binoculars Equatorial Mount	*S&P ch. 7* **Unit 1 project: Telescope manual**
Oct 13	AUTUMN RECESS	*no class*
Unit 3: Optics		
Oct 20 *NM*	*Independent Observing, Star-hopping* Annual Motion & Coordinates Observation Preparation	Stars & Constellations III **Telescope Quiz due**
Oct 27 *WxC*	*Independent Observing* Optics and Telescopes	**Unit 2 project: Stellar motions** *S&P ch. 16*
Nov 3 *WxG*	*Field Trip to MacLeish Field Station – or – Binary Stars* Telescope Resolution	**3 observations due** *S&P pp. 194-198 + app. 6*
Unit 4: Astrophotography		
Nov 10* *WnG*	*Independent Observing* Camera Operation & Astrophotography	*Canon DSLR manual*
Nov 17* *WnC*	*Astrophotography*	**Unit 3 project: Telescope Properties** 3 observations due (optional) *Astrophotography handouts*
Nov 24 *WxC*	*Independent Observing & Astrophotography* DSLR Image Processing	
Dec 1 *WxG*	*Independent Observing* Digital Imaging	*S&P ch. 8 + pp. 481-494*
Dec 8* *WnG*	*Independent Observing* Star trail image presentations	**Observing Notebook** **Unit 4 project: Star trails**

COURSE COMPONENTS

Laboratory Exercises

There will be an in-class lab exercise almost every week, usually due the following week. Some are done on the roof, and some in the classroom, depending on the weather. This is the main component of class. Please note that even if you work in a group, *each member must turn in their own worksheet, in their own words*.

During the second half of the semester, we'll use most clear nights to perform independent observations with the telescopes and take photographs. Weather permitting, we will take a field trip to the MacLeish Field Station in Whately, MA, where we'll enjoy much darker skies than in Northampton. (Possible field trip nights are marked with an asterisk* on the course schedule.)

Pre-class Exercises

These are short exercises that consist of an observation or prediction as a warm-up to our in-person class period, or a quiz on the week's reading or video. The purpose of pre-class exercises is to get you thinking about the topic we're going to discuss in class and prepare you for the lab exercise. They should take 30-60 minutes to do. In fact, if you have worked on a pre-class exercise for an hour and still have not finished, you may simply stop.

Unit Projects

The coursework is divided into four units. The labs are done during class, with supervision. At the end of each unit, you will complete a short, independent project that synthesizes the concepts from the labs. Each unit project is different: there's an instruction manual, an observing project, an essay, and a photography project. Some will be done with partners, and some on your own. There will be some time set aside in class to work on the unit projects.

Sky & Telescope Quizzes

There are two practical quizzes in the class. In the Sky Quiz, **due by Sep 22**, you will identify constellations and bright stars for your instructor or a TA. Similarly, for the Telescope Quiz, **due by Oct 20**, you will demonstrate that you can use the telescope safely. Note that in the case of difficult weather, these deadlines *may* be moved. However, you should take them as soon as you can.

Observing Notebook

After you have learned how to use the telescopes and to navigate the night sky, you will begin observing independently (usually with a partner). A minimum of 10 independent observations must be made and collected into an observing notebook; details will be explained later in the semester. Three observations are **due on Nov 3** and **17**; the complete observing notebook is **due on Dec 11**, the last day of classes. Although we will dedicate some class time to making observations for the notebook, students will need to come in during night lab to complete all ten observations.

ASSESSMENT

Your final grade in this course will be decided by you, in conversation with me, based mostly on:

- growth and learning you achieved over the course of the semester
- completion of assignments
- effort you made on those assignments
- attendance and preparedness for class (readings, *etc.*)
- effort put into providing feedback to your peers
- feedback on your work from your instructors and peers throughout the semester
- self-reflection at various points during the course
- engagement in the learning community of our class

We will meet one-to-one at least 3 times to discuss your interests, learning, and growth. You will be asked to provide some honest self-assessment prior to those meetings to inform our discussions. At the final one-to-one meeting of the semester, we'll discuss your proposed final grade for yourself. I reserve the right to adjust that grade, but I don't expect to need to do that except in a very few cases.

Why won't work in this class be graded more traditionally? Your goal in this class should be to learn, and grades do not help with learning. In fact, they steal attention away from the more important feedback that contributes to growth and improvement.

Although I will not assign a grade to your work, I will provide extensive feedback, record whether an assignment was turned in and if it was on time, and I'll keep track of attendance and class participation.

Here is one possible weighting of course components – your goals may vary

Labs	45%
Pre-class exercises	15% (completion only)
Unit Projects	15%
Observing notebook	20%
Class Participation	5%

CULTURAL PERSPECTIVES ON THE SKY

The sky belongs to everyone. Every human culture, through careful observation and study, has drawn inspiration and meaning from the heavens and incorporated the sky into their belief systems, religion, cosmology, cultural practice, and seasonal activity. In this class, while we will intersperse discussions of different cultures' observations of the sky into numerous topics and projects, we will revert to the Greco-Roman constellations and Arabic star names that are currently in common use by the international astronomical community. This is due in part to a need for a common system, but the choice clearly reflects the imposition of a Eurocentric perspective. That there are many other star and constellation systems in use now and historically, including among the Nonotuck people on whose ancestral homelands Smith College sits. We invite and encourage you to explore and share any additional cultural perspectives on the sky at any point this semester.

AST 103 Generative AI policy

Writing is important to the learning process because it helps you to organize your thoughts. Does feeding a prompt to a generative AI engine help organize thoughts in a similar way?

Most of the work that we will be doing in class will be in-class labs or observations. By their nature, none of these can be done by AI.

However, the four Unit Projects are short, responsive writing assignments plus some calculations or observations (or both). The Independent Observing Notebook also asks for a paragraph of information with each observation.

This class uses an alternative grading scheme. Much more importantly, these writing assignments are short, formative exercises (like a homework) rather than extended, summative projects (like a term paper). I'm open to experimenting with AI as a learning tool in this kind of environment. You are also very welcome to do these assignments without AI!

You are permitted to use generative AI for these writing assignments **only under the following conditions.**

1. Submit your AI prompt along with the written passage generated by AI.
2. If you use a series of multiple, iterated prompts, submit all prompts that eventually got you the written passage you turned in.
3. If you revised an AI passage, turn in the prompt(s), the original passage with your edits, and your final passage.

Caveat emptor (buyer beware): Generative AI is known to "hallucinate," or make up facts. It is in your best interest to fact check anything that it writes for you.

Finally, please keep in mind Smith's academic honesty policy. In any work you turn in, avoid plagiarism and be transparent about **all** use of AI.