

ASTR 1504 - Descriptive Astronomy

Fall 2026 Syllabus, Section 03, CRN 40006,

Credit hours: 3

Instructor

Patrick Durrell

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Public Instructor Information

Professional Qualifications:

Ph.D., Physics & Astronomy, McMaster University, 1996

M.Sc., Physics & Astronomy, McMaster University, 1992

B.Sc.(Honours), Astronomy, University of Victoria, 1990

- YSU Distinguished Professor
- Warren M. Young Endowed Chair of Physics & Astronomy
- Director, Ward Beecher Planetarium
- Member of the American Astronomical Society, the Canadian Astronomical Society, and the International Astronomical Union.

Office Location: Ward Beecher 2027

Office Phone Number: 330-941-7107

Course Description

1504. Descriptive Astronomy. Scientific method, introduction to modern understanding of the universe, astronomy and society, humanity's place in the universe. Astronomical observing methods, the solar system, stars and star systems, galaxies, cosmology. Recent astronomical discoveries. 3 s.h.

Course Readings

Group	Title	Author	ISBN
Required	Astronomy 2e	Andrew Fraknoi, David Morrison and Sidney Wolff	978-1-951693-50-3
Required	Lecture Tutorials for Introductory Astronomy, 4th edition	Ed Prather , Gina Brissenden , Colin Wallace, Jeffery Adams	978-0135807026

- Astronomy 2e is a **free**, online course text in PDF format. Updated often. **Most, if not all, assigned readings will be from this textbook.** Which sections of the text that are assigned will be shown in-class and in the PDF online notes. We will **not** cover the entire textbook; so please pay attention to class material to see what topics have been covered and any assigned readings. *It is in your best interest to read relevant sections of the text as we go through the course.*
- The lecture tutorials workbook is required for in-class, student centered activities. Bring this book to class every day. Hardcopies of this workbook that have NOT been written in are strongly preferred. LT_4_cover.jpg
- There **may** be secondary readings related to new astronomical discoveries; any links to (for example) related press releases or videos will be shown in-class (and posted on Blackboard) as needed. Other parts of the text covering course material that are **not** assigned are recommended for students who want additional information to assist with learning course material.

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Additional Course Materials

Online Course Notes (PDF): The online course notes available on BlackBoard are PDF files containing many of the Keynote slides that are presented in-class. *These notes are NOT complete*, and contain most of the text, and some of the images shown in class. Animations, lecture tutorials, in-class questions and image-heavy slides are not included. Use of these PDF files is **optional**, and are provided for those students who wish to have digital

copies of class notes, or to see what material was covered in classes a student may have missed. **The online notes are NOT, however, a replacement for regular class attendance.**

Lecture Tutorials: The Lecture Tutorials (LT's) are in-class student-centered activities to assist with understanding course material beyond what is presented during lectures. These activities are *not* optional and are to be completed through *active* discussion in small groups (2-4) of students; completing them alone defeats their intended purpose.. You will not submit these for grading. The LTs are considered part of your notes, and the questions are similar to what you will see on exams. *The LTs are a critical component to your success in the course* **The answers to these tutorials are not posted.** If you do not complete the LTs during class, you are expected to complete them outside of class.

The Ward Beecher Planetarium:

The Ward Beecher Planetarium (wbplanetarium.org) is one of the largest university planetariums in the country and is the classroom for Astronomy 1504. There are also public programs ([free admission](#)) on most Friday and Saturday evenings throughout the semester; students are encouraged to attend these as their interest permits. As the planetarium is used for public programs and school groups, please do not put your feet on the seats, and remove all items that you bring in with you to class. For the Astronomy 1504 classes, there are typically 4-6 presentations using either the planetarium star projector or the 4K fulldome video projection system.

IMPORTANT: *for safety reasons, the planetarium doors are locked during planetarium presentations;* students who leave the planetarium during presentations cannot be re-admitted, and people who arrive late to class **cannot** enter the planetarium until after the show is over.

Other Materials: Students will also use **Webex** (microphone needed; video not required) for online student support hours, and (supplied) index cards and ABCD cards for classroom activities and questions.

How to Succeed in This Course

Astronomy 1504 is a Gen-Ed course with plenty of material that will be new to most students. Below are important tips; all of these are critical components to doing well in this course.

- **Come to class regularly and keep up with assignments and assigned readings.** Assignments and tests are completed **in-class only** (there are no online options), and many in-class activities (including star shows, videos/animations, lecture tutorials, in-class questions and any discussions) are **not** available in the PDF online notes. Astronomy 1504 is built around in-person activities and in-class participation and is not designed as an online class. The student is responsible for all assigned reading material and any other material (or announcements) presented in class.
- **Ask questions!** Students are *strongly encouraged* to use Student Support Hours (whether online via Webex or visiting me in my office) to ask questions. *Please ask questions – I really want all students to not only understand the course material, but also to enjoy learning about the universe around us.* If you are unable to meet with me during Support Hours please email me and we can arrange a different time to talk, whether it be in person, or online.
- **Active discussion during the Lecture Tutorials.** The LTs are most useful when students in small groups of 3-4 discuss scientific principles and questions related to those principles. Doing the LTs on your own, or without active discussion with other students, defeats the enhanced learning that comes from such discussion;. Some questions on term tests and the final exam are related to questions from those LTs conducted in class..
- **Read** assigned sections of the text and go over your notes outside of class. Most importantly, if you have questions, please ask! Remember that most concepts in ASTR 1504 are new to most students.
- **Tutoring:** The **Resch Academic Success Center** has Academic Coaching and Tutoring for over 200 courses
 - **When:**
 - **Where:**

Technology

To successfully complete this course, you will need access to a computer with internet and Microsoft Office Suite (available free). Blackboard is free to use with your YSU login here. Please let me know the first day of class if you do not have the appropriate access to technology and/or anticipate having trouble navigating Blackboard. We will work together to make sure technology is not a barrier to your success in this course.

Blackboard: Please be sure to login to Blackboard a few times per week during the duration of the course. Blackboard will be regularly used to share important course information, and is used to post your grades for assignments and tests.

Understanding Early Alerts

In all your classes, your professors can create a "flag" related to your performance in a class. Professors may indicate that you are having difficulty understanding course material, not attending class, missing assignments, etc. These alerts do NOT stay on a permanent record, and they are NOT used in any way as a penalty against you. *The alerts are used to help you find a solution that is realistic and helps you succeed.*

How to Get Help

YSU is committed to your success. As a student you have access to several resources that may be instrumental in helping you succeed in this course and others. Please do not hesitate to utilize any of these free support services to support your academic success, physical and mental health, and help you navigate your time as a YSU student.

[Click here for YSU Student Support Resources](#)

Tentative Weekly Schedule of Course Topics

Week of	Reading(s)	Proposed Topic	Due/To Prepare for Class
8/24	Text Content – Ch. 1, 2 Assigned: Ch. 1.1-1.4, 2.1	Course introduction. The scientific method. The night sky and constellations. First planetarium program	
8/31	Text Content – Ch. 2, 4 Assigned: Ch. 2.1, 4.2	Positions/motions on the celestial sphere, motions of the Earth. The seasons.	Have Lecture Tutorial workbook by beginning of this week
9/7	Text Content – Ch. 4, 2 Assigned: Ch. 4.5, 4.7	Understanding and predicting Moon phases, eclipses. Greek astronomy	
9/14	Text Content – Ch. 2, 3 Assigned: Ch. 2.4, 3.1	Copernicus, Galileo, Kepler and Kepler's Three Laws of Planetary Motion	TERM TEST 1 - Friday Sept. 18
9/21	Text Content – Ch. 3, 5 Assigned: Ch. 3.3, 5.2	Newton's laws of motion, gravity+ gravity. Orbits. Light and the electromagnetic spectrum	
9/28	Text Content – Ch. 5 Assigned: Ch. 5.2, 5.6	The blackbody spectrum and the colors of stars. The types of spectra and spectral lines. The Doppler effect	
10/5	Text Content – Ch. 6, 7 Assigned: Ch. 6.1, 6.2	Telescopes, including the different types. Large telescopes in space and on the ground, including the Hubble and the JWST. Introduction to the solar system	
10/12	Text Content – Ch. 7, 13 (only select parts) Assigned: none	Asteroids, comets, impacts	TERM TEST 2 - Wednesday, Oct. 14
10/19	Text Content – Ch. 14, 21 (only select parts) Assigned: 14.4, 21.4	Meteors. Pluto. The formation of our solar system. Exoplanets	
10/26	Text Content – Ch. 8, 9, 10 (only select parts) Assigned: None	Earth's atmosphere. The greenhouse effect and aurorae. The surface of the Moon, craters,, Mercury, Venus, Mars	
11/2	Text Content – Ch. 11, 12, 15, 16, 19 (only select parts) Assigned:19.2	Planetary moons. The giant planets and planetary rings. The Sun and nuclear fusion energy generation. The nature and distances to stars (parallax)	
11/9	Text Content – Ch. 17, 18 (only select parts) Assigned: 18.4	Properties of stars (luminosity, temperature, The HR Diagram size, mass).	TERM TEST 3 - Monday, Nov. 9
11/16	Text Content – Ch. 18, 21, 22 (only select parts) Assigned: 18.4 22.1	Stellar evolution – the formation and lifetimes of stars. The main sequence. White dwarfs and supernovae, neutron stars	
11/23	Text Content – Ch. 24, 25 Assigned: 24.5, 24.6	Black holes. The Milky Way Galaxy	
11/30	Text Content – Ch. 25, 26, 28, 29 (only select parts) Assigned: 25.3, 26.2	Dark matter. Galaxies, the expanding universe. Cosmology and the Big Bang model. The Cosmic Microwave Background	
12/7			FINAL EXAM: FRIDAY, DEC. 11, 2026 (10:30am-12:30pm)

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.

FAQ (Frequently Asked Questions)

Q: Dr. Durrell -- astronomy is a fascinating science, but I am worried about how much math will be in the course.

A: The course will only make use of some math/algebra and a few equations that are necessary to show how exact solutions using equations can be used to understand the universe (such as gravity, light, planetary orbits). The course is mostly descriptive, and nothing above basic algebra is needed. So, no calculus or trigonometry is needed for any aspects of this course.

Q: Do you have *extra-credit* assignments in this course?

A: **No** (so please don't ask) **Q:** Are you sure?

A: Yes, I am quite sure.

Q: I missed a term test or an in-class assignment. Can I take a make-up test/assignment?

A: You qualify for a make-up test or assignment only **if** your absence falls under those given by **YSU's Attendance Policy**. Students must let me know *as soon as is possible* about a make-up, but no later than one week after the original assignment or test date.

Q: I have classes (or otherwise unavailable) during your student support hours. How can I ask questions?

A: Email me and we can arrange to meet virtually (via Webex) or in-person at a time that works best for both of us! Please do ask questions!

Q: Do you have review sessions in this class?

A: **Yes** -- I have in-person review sessions before each term test and the final exam. *However, these take place outside of normal class hours.* These are 'question and answer' format -- students ask questions, and I will answer them for all students who can attend.

Q: Do you give out review sheets before exams?

A: **No**. Exam material will be based on what is presented in class, including any discussions, assigned textbook reading, notes, videos/animations, planetarium programs. The online PDF notes are a guide to topics discussed.

Q: How can I get my **current** grade in the course?

A: Your grades will be posted on the GradeBook on the BlackBoard site. An estimated 'Grade so far' will be placed there a few weeks into term after a few assignments or tests have been completed. If you have any questions, please ask me.

Q: What advantages are there in attending lectures versus reading the online PDF notes? (*or...Why should I bother going to class?*)

A: The lectures include material that is **not** in the PDF notes. These include animations, videos, discussions, and in-class questions, which are of the same style as questions on the tests. Most fulldome programs or star shows are only viewable in-class only, with no online options.

Q: Are aliens visiting us here on the Earth?

A: **NO** - there is NO credible evidence that we *are* being visited -- or have ever *been* visited -- by extraterrestrial life forms.