ASTR 1504 - Descriptive Astronomy

Fall 2026 Syllabus, Section 01, CRN 40004,

Credit hours: 3

Instructor

Patrick Durrell

Professor of Astronomy

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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.

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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.*
  - You can purchase a print version of the course textbook via the YSU bookstore or from OpenStax. *However, the print version is over 1200 pages, so the online PDF is strongly recommended*) Web view is recommended -- the responsive design works seamlessly on any device. **If** you purchase this book online, be sure get the official OpenStax print version, as simple printouts sold by third parties on Amazon are not verifiable and are not as high-quality.
- 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.

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: WEDNESDAY, DEC. 9, 2026 (8am-10am)

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.