

## ASTR 1810: Introduction to Astronomy – Fall 2018

**Instructor:** Prof. Christopher O'Dea

**Office:** 336 Allen (Physics) Bldg

**Phone (Voice Mail):** (204) 474-9863

**Dept of Physics and Astronomy Main Office Phone:** (204) 474-9817

**Email:** [odeac@umanitoba.ca](mailto:odeac@umanitoba.ca)

**Office Hours:** Mondays & Wednesdays 1:30-2:30PM (or by appointment)

**How to Contact:** My preference is to be contacted by email for an appointment or for questions outside of class.

**Class Hours:** 10:30-11:20 AM MWF (5 Sep. – 07 Dec., 2018)

**Location (Lectures):** 343 Drake Centre

**Credit Hours:** 3

**Lab Instructor:** Dr. Danielle Pahud

**Office:** 221 Allen

**Phone (Voice Mail):** (204) 474-6202

**Email:** [Danielle.Pahud@umanitoba.ca](mailto:Danielle.Pahud@umanitoba.ca)

**Office Hours:** by appointment

### Teaching Assistants:

Erica Franzmann: [umfranze@cc.umanitoba.ca](mailto:umfranze@cc.umanitoba.ca)

Benson Guest: [umquest@myumanitoba.ca](mailto:umquest@myumanitoba.ca)

Chelsea Braun: [umbrau59@myumanitoba.ca](mailto:umbrau59@myumanitoba.ca)

Jordan Lasuik: [lasuikj@myumanitoba.ca](mailto:lasuikj@myumanitoba.ca)

**Course Website:** <http://www2.physics.umanitoba.ca/u/odea/phys1810/>

**Lab Website:** [http://www.physics.umanitoba.ca/astro/?page\\_id=121](http://www.physics.umanitoba.ca/astro/?page_id=121)

**UMLearn:** Class announcements, info, and lectures will be posted on UMLearn

Note: Any questions about the lectures and tests material should be directed to Prof. O'Dea. Questions about the labs and observing sessions should be directed to Dr. Danielle Pahud or the teaching assistant. Please also check UMLEARN for regular updates related to the course or for any announcements.

### Synopsis:

This first year astronomy course introduces students to classical astronomy and some basic astrophysics in order to understand the observed properties of stars and galaxies. Using lectures and laboratory sections, it provides an astronomy background and an introduction to the scientific method. Topics include the tools to explore the sky, the physics of light and matter, the properties of stars, exoplanets, life in the universe, and a brief introduction to 'exotic' stars (white dwarfs, neutron stars and black holes), galaxies, and cosmology.

This course is mainly descriptive, taught at a qualitative level, with simple arithmetic and trigonometry used frequently. Some basic laws of classical and modern physics that are relevant to astronomical applications are also introduced. **See below for a list of the course topics.**

*Not to be held with the former 016.180. This is a 3.0 credit hour-course.*

**Course Goals:** This course will introduce students to the fascinating subject of astronomy and covers a wide range of topics from planets and stars to galaxies and the interstellar medium. This course is ideal for students looking into a science elective, and is very useful for students going into the subjects of Physics and/or Astronomy. It also serves as an introduction and foundation of astronomy for the students wanting to continue in astronomy/astrophysics. The course introduces students to the Scientific Method and covers a

range of interesting topics that would be of interest to anyone curious about our universe and origins.

**Textbook: Astronomy Today** by Chaisson and McMillan, the 10<sup>th</sup> Edition (9<sup>th</sup> Edition accepted).  
(The book is on reserve at the Sciences & Technology Library). An e-book is available for purchase from the book store.

**Using Copyrighted Material:** We will use copyrighted content in this course. Please respect copyright. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works anywhere, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact [um\\_copyright@umanitoba.ca](mailto:um_copyright@umanitoba.ca).

**iClicker or smartphone with iclicker app:** All students will require an iClicker, a classroom response system keypad available at the bookstore for purchase (some of you may already have it as it's also required for other courses at the University). The iClickers will be used regularly in class for the following reasons: 1) as a learning tool (particularly for practicing test questions) and to engage the students, 2) for monitoring students progress or areas of difficulty, 3) to assess the students understanding of concepts covered in class or to be discussed during the upcoming lecture, and 4) to aid the instructor in taking attendance.

**Important: Bring your iClicker to class every class. 5% will be assigned to the iClickers sessions.**

**Note that you may use a smartphone with the iClicker app instead of the iclicker keypad.**

**Course Technology:** It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. The student can use all technology in classroom setting only for educational purposes approved by instructor and/or the University of Manitoba Student Accessibility Services. **Student should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming" during scheduled class time.** If student is on call (emergency) the student should switch his/her cell phone on vibrate mode and leave the classroom before using it.

As mentioned above, the iClicker will be regularly used in class. Make sure you bring it with you every lecture.

### Grading Scheme

The final grade consists of the following components:

- 35% - two term tests: 15% for test1, 20% for test2
- 35% - final examination
- 5% iClicker sessions
- 25% - labs plus observing session
  - see Dr. Danielle Pahud's web page for details on that course component

In summary the lectures component weighs 75% of the total mark, and the lab+observing component weighs 25%. Dr. O'Dea is in charge of the former (tests and final exam related to the class lectures), and Dr. Danielle Pahud is in charge of the latter (labs+observing).

### Test Information

The term tests and the final exam will emphasize the material presented in the lectures. All tests are closed textbooks. The iClicker questions done in class could serve as practice test questions. The two term tests will take place in class and during the lecture time (so no conflicts with any other courses should occur).

### Term tests

There will be **two** multiple-choice tests given during the term, tentatively scheduled for Fri. Oct. 12 and Fri. Nov. 09 (during the class hour). The exact dates will be announced in class and posted on the course website. Do not make any travel plans around those dates as no make-ups!

Also, remember to bring a (non-programmable) calculator and pencil to the test!

**Duration:** 50 minutes each

**Location:** in the classroom

**Value:** Both tests are worth 35% total (15% on the first test and 20% on the second test).

**There will be no deferred term test under any circumstance.** Only in the case that a written note provides a valid reason (such as illness, funeral) for missing a test, then a mark for the missed test will be assessed from the final exam. However, any test missed without a valid official written note will receive a mark of zero.

### Final Examination

**Duration:** 2 hours.

**Value:** Test is worth 35%. Deferred exams are arranged by the student with their faculty, **not** with the instructor of the course, and will be subject to the University guidelines.

**For both the tests and the final exam, no programmable calculators or textbooks are allowed.** Also cell phones and any other electronic device are explicitly listed as unauthorized materials, and must not be present during tests or examinations.

### Some important dates (Fall 2018):

<http://umanitoba.ca/student/records/deadlines/>

Sep. 05: 1<sup>st</sup> day for ASTR1810.

Sep. 18: Last date for refund for dropped course

Oct. 08: Thanksgiving. No classes.

Nov. 12: Remembrance day. No classes.

Nov 13-16: Fall Term Break.

Nov 19: Last day for Voluntary Withdrawal (VW) from Fall courses.

Dec. 7: Last day of classes.

Dec. 10-21: Final examination period.

Students must remain available until all examination obligations have been fulfilled. *Final exam date for phys1810 is to be scheduled by the University at a later time (to be announced as soon as it's known).*

### Tentative Topic Outline (to be updated regularly on the course website):

| <b>Topic</b>                                                                                                                                                                                                                                                                                                                            | <b>References</b>                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Exploring the Sky:<br><i>Scale of Universe, Mathematics background, Celestial Sphere and coordinates, Distance Measurement (parallax)</i>                                                                                                                                                                                               | Chapter 1                                                       |
| Probing Matter, Light, and their Interaction:<br><i>Some History and the birth of Modern Astronomy, Kepler's Laws, Newton's Laws, Gravity, Escape Velocity, Electromagnetic Spectrum, Blackbody Radiation, Wien's Law, Stefan's Law, Doppler Effect, Kirchoff's Laws, the Bohr model of the Hydrogen atom, Spectroscopy, Telescopes</i> | Chapters 2, 3, 4, 5                                             |
| Our Solar System:<br><i>Planets in brief, Exoplanets, Life in the Universe, Energy Production in the Sun</i>                                                                                                                                                                                                                            | Part 2 (very briefly), Chapter 15, 16 and supplemental material |
| Properties of Stars:<br><i>Distance, Magnitude, Brightness, Luminosity, Temperature, Radius, Mass, Stellar Color and Profiles, H-R diagram</i>                                                                                                                                                                                          | Chapter 17                                                      |
| Interstellar Matter, Stellar Formation, Evolution and Death:<br><i>Nebulae, Star forming regions, evolution off the main-sequence, Formation of the Elements, Novae and Supernovae, Supernova Remnants</i>                                                                                                                              | Chapters 18, 19, 20, 21                                         |

|                                                                                                                                 |                                   |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Exotic Stars:<br><i>Degeneracy, White Dwarfs, Neutron Stars including magnetars, Quark Stars, Black Holes</i>                   | Chapter 22, supplemental material |
| Galaxies and Cosmology (an Introduction):<br><i>Our Milky Way, Hubble's Law, Active Galactic Nuclei, Dark Matter, Cosmology</i> | Part 4 (very brief summary)       |
| Other hot or timely topics:<br><i>Press releases, Astronomy Picture of the Day, New Planets, News..</i>                         | Supplemental Material             |

### Laboratory and Field Trip Observing Sessions:

This course component provides an opportunity to complement and supplement the lecture course material in a different and practical way. The seminars do not rely directly on the lectures and are independent of them. **Since this is a lab-credit course, passing the lab component is a mandatory criterion for passing the class.**

The website for the labs, observing sessions, and related announcements:

<http://www.physics.umanitoba.ca/astro/> (*click on the courses tab, then astr1810*)

Labs start the week of Sep. 14<sup>th</sup>, i.e during the first full week of classes. The first three labs will take place in the Lockhart Planetarium (Room 394 University College). The following labs (starting on Oct. 05<sup>th</sup> week) will take place in 385 University College. You will be also expected to do an observing session. Please see the accompanying material to be provided by Dr. Danielle Pahud for further details on the labs and observing sessions and the corresponding grading scheme.

### Required Supplies for the lab and the field trip observing:

- Duotang Covers (3)
- Ruler 30 cm (mm divisions)
- Sharp pencil & eraser
- Protractor
- Calculator (optional)
- Holographic Diffraction Grating (*available at the bookstore*)
- Telescope Kit (*available at the bookstore*)

### Academic Policies

The Faculty of Science asks us to inform you that academic dishonesty has serious consequences.

The Faculty of Science and The University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include, but are not limited to bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination personation.

Penalties that may apply, as provided for under the University of Manitoba's Student Discipline ByLaw, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. The Student Discipline ByLaw may be accessed at:

[http://umanitoba.ca/admin/governance/governing\\_documents/students/student\\_discipline.html](http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html)

The Students' Discipline Document is available from the Faculty of Science:  
<http://umanitoba.ca/faculties/science/resources/ScienceDisciplineProcedures-June2013.pdf>

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.

Some other links:

The Faculty of Science Template Statement on Academic Dishonesty:

[http://umanitoba.ca/faculties/science/resources/Science\\_StatementOnAcademicDishonesty2013.pdf](http://umanitoba.ca/faculties/science/resources/Science_StatementOnAcademicDishonesty2013.pdf)

How to avoid cheating and plagiarism -- take the Academic Honesty Quiz:

[http://umanitoba.ca/student/resource/student\\_advocacy/academic\\_honesty\\_quiz.html](http://umanitoba.ca/student/resource/student_advocacy/academic_honesty_quiz.html)

Last but not least: **Want to do more physics or astronomy?** Check this out (or talk to me!)

<http://umanitoba.ca/faculties/science/departments/physics/index.html>