

## **PHYSICS 270: Astronomical Observations, Instrumentation and Data Analysis**

(Wed. & Fri., 8:30 – 9:50am in DWE3522)

This is a general and broad introduction to observational astronomy. It is not meant to provide an in-depth study of any one aspect of this topic: e.g. CCD cameras or data-analysis software.

**Instructor:** Mike Fich

**email:** fich@uwaterloo.ca (*please include “PHYS270” on the subject line on ALL emails*)

**Office:** 255 Physics (ext 32725)

**Office Hours:** Thurs. 2:00 - 3:00pm (*or by appointment at other times*)

**Textbook:** To Measure the Sky by F. Chromey

Additional materials will be posted on course webpage on UW Learn

**PHYS270L:** the lab course companion to this course is compulsory for all students

**Grading:** Assignments = 30%, Midterm = 30%, Final Exam = 40%

**OR:** Assignments = 15%, Midterm = 15%, Final Exam = 70%

(*whichever gives the better grade*)

There will be five assignments in this course: probable due dates (subject to change): May 17, Jun 7, Jun 28, Jul 5 (possibly Jul 10), Jul 19. Note that overdue assignments are accepted, but only until the moment when solutions are posted online (expected no more than one week after stated due date, but could be sooner – if you are going to be late handing in an assignment it is your responsibility to determine the cut-off time and submit before then). Assignments will be quantitative and will often be best done using a numerical technique. The use of python will be encouraged (and code examples will be provided).

### **MIDTERM EXAM: Jun 14?? in class**

**Course Outline** (# lectures is approximate.) (*textbook chapters in italics*)

**No Classes on Fri, May 18, Wed May 23, and Fri May 25**

**(make-up lectures will be scheduled)**

Calendar description: Telescopes, instrumentation and observations at different wavelengths (radio, sub-millimetre, infrared, optical, X-ray). Probability and statistics. Data archives and data analysis.

1. Properties of light, Telescopes (3 lectures) *Chapters 1, 5, 6*
2. Instruments, Detectors, CCDs, spectroscopy - prism, grating, echelle, FTS, Fabry-Perot, radio and infrared and submillimetre astronomy, interferometry (4 lectures) *Chapters 7, 8, 11*
3. Observing (4-5 lectures) *Chapters 3, 4*
4. Data Statistics (4 lectures) *Chapter 2*
5. Data Analysis (4-5 lectures) *Chapter 9, 10*
6. Data archives and (Observing/Experiment) Project management (2 lectures)

## ACADEMIC INTEGRITY:

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*Collaboration: Students should be aware that there are limits to the amount that they may collaborate with other students. All of the assignments in this class are for individual work – none allow team work. This means, at the very least, that written solutions and answers should not be shared between students. In general, talking to each other about approaches to solve the given problems is allowable, but specific detailed descriptions of the methods used are not permissible.*

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**Grievances:** *Students, who believe that a decision affecting some aspect of their university life has been unfair or unreasonable, may have grounds for initiating a grievance. Students should read [Policy #70](#), Student Petitions and Grievances, Section 4. When in doubt, students must contact the departmental/school administrative assistant who will provide further assistance.*

**Appeals:** *A decision or penalty imposed under Policy 33 (Ethical Behavior), Policy #71 (Student Discipline) or grievances under Policy #70 (Student Petitions and Grievances) may be appealed, if there is a ground. Petitions may not be appealed. Students who believe they have a ground for an appeal should refer to [Policy #72](#) (Student Appeals).*