Astronomy 3130 – Observational Astronomy - Syllabus
Spring 2017

**Instructor:** Michael Skrutskie (mfs4n)

**Office Hours:** Directly after class and by appointment (don't hesitate to email to arrange an appointment)

**TA's:** Matt Pryal (dla3pw) and Robby Wilson (rfw3ev). Office hours also by appointment. Available during the scheduled lab sessions.

**Lectures:** Tuesdays and Thursdays 11:00 a.m. – 12:15 p.m.     Room 265 Astronomy Building

**Labs:** Scheduled Tuesdays or Wednesdays 9:00 – 11:00 p.m.  **HOWEVER** actual lab times will be flexible (including duration) to accommodate clear weather and the scope of the labs. Sections will meet to conduct lab activities at the scheduled Tuesday or Wednesday time whenever possible. Sometimes this meeting will be used for lab preparation and occasionally for additional lectures/instruction. Sometimes actual clear sky lab activity will take place. Significant time at the telescope will be required beyond the scheduled lab hours simply to complete the required assignments, certainly when travel time to and from the telescope is included. Observing at Fan Mountain will require particular dedication in this regard.

Substantial tenacity, initiative, flexibility and time commitment will be required from you in order to maintain the lab schedule given the vagaries of the weather. Often it will become imperative to drop everything and complete lab observations on what will obviously be the last clear sky window available for some time. Persistent cloudy weather may lead to re-negotiation of a lab deadline with the class, however last-minute cloudiness will not be considered an excuse for overdue assignments.

You must complete all of the assigned labs to receive a grade for this course.

Observing notebooks are a core feature of this course. You should have your notebook with you whenever you are doing lab work, either pre-lab or night lab at the telescope. You notebook is the journal where you record all ephemeral information that you will need at some future time to reconstruct what you were doing. Write sentences. Draw figures. Tape in printout that might be relevant. This notebook is your scientific diary for the course. Make it a work of art. Detailed notes of your activities in lab, not to mention laboratory note taking, are so important that the notebook itself is 10% of your final grade.

**Course Prerequisites:** This course is designed for third-year Astronomy and Astronomy-Physics majors. By this time majors should have completed introductory Physics and Calculus sequences and should have had exposure to computer coding via CS1110 or PHYS 2660 and have developed familiarity with basic statistics. **Students with backgrounds that do not obviously meet these minimum standards must consult with the instructor early in the semester.** This course should not be considered as an option of fulfilling a 3000-level elective for the Astronomy minor unless the student is truly fascinated with learning the details of quantitative astronomical observation (said another way, this course is several times more work than the average 3000-level astronomy course).

**Course Objectives:** Students in this class will conduct and analyze astronomical observations with professional quality goals. Observing techniques will emphasize knowledge, skills, and
instrumentation applicable to planning and executing observations in a manner similar to astronomers conducting research observations. Particular emphasis will be focused on constructing the lab reports with an eye to clarity of presentation and style similar to that used in journal publications. In order to do so students will need to apply basic statistical principles, use professional astronomical research tools, and write simple computer programs.

**Textbook(s):** No one book does a good job of capturing the necessary background for the course. Readings will be assigned in *Observational Astronomy* by Birney and *To Measure the Sky* by Chromey. Copies of these books are available for student use in the grey steel cabinet in Room 213 in the Astronomy Building.

**Lectures vs. Textbook:** The in-class lectures and lecture notes are a poor substitute for the details embedded in the assigned readings. The posted powerpoints contain talking points to be elaborated upon in class (attendance is thus important). It is expected that each student will carefully read the assigned material (except where light reading is expressly indicated). Readings will be posted week-by-week on the course schedule website listed in the “course resources” section at the end of this document.

**Grade Breakdown:** The following elements of the course will be weighted as indicated to achieve a final total score for the course. Grading and scaling of grades (if necessary) will be such that the final grades will map fairly well onto a 90-100 = A, 80-90 = B,.... grading system.

- Observing Notebook (10%; evaluated at the end of the semester by turning in the notebook)
- Daytime assignments and lab preparation assignments (20%)
- Midterm Exam (20%)
- Laboratory Assignments (40%, yes… 40%... the labs are core to the course… take the assignments quite seriously and respect the deadlines)
- Final Project (10%)

**Student and Equipment Safety:** The equipment and telescopes used in the conduct of these laboratories ranges from expensive to priceless. *Even more priceless is the health and safety of the course participants and instructors.* A policy of “safety first” applies to both the equipment and the individuals. If there is the least question as to whether your next move is a safe one stop what you are doing and assess the situation. Do not hesitate to call in the instructor for help. Whenever an accident happens it is very likely that the last thought before the incident was, “maybe I shouldn't do this.” In retrospect the mistake in judgment is almost always obvious and the skill lies in identifying that bad judgment before it turns into disaster. Make it a habit to identify the bad choice before executing it. If something is physically stuck don't push or hit it harder. If something is stuck there is a reason and pushing will only get you into more trouble. Back off and figure out the cause of the problem and/or call for help.

**Group vs. Individual Work:** You will learn most effectively in this course when you work closely with others, especially when you understand something and instruct one of your fellow students. Group work is encouraged and highly valued. That being said, lab write-ups are your personal work. You will acquire the data in a group and likely team for the analysis of that data, but at that point it is entirely up to you to develop your presentation of the lab's results. We will provide lab write-up guidance with the first lab to provide pointers on our expectations for good format. The day
assignments and pre-lab assignments are meant to be individual assignments unless otherwise indicated.

**Course Resources:** The course home page is [http://faculty.virginia.edu/skrutskie/ASTR3130/](http://faculty.virginia.edu/skrutskie/ASTR3130/). Probably the most important reference is the “course topics and schedule” page under the home page where the week-by-week lectures, readings, and assignments will be archived. Significant exchange of assignments and course work will also occur in the UVa Collab “assignments” section.