

**Syllabus for FRI Astronomy Stream:
Exploring the Physics of the Universe with White Dwarf Stars**

(<http://rocky.as.utexas.edu/~mikemon/FRI/ast2.html>)

Faculty Stream Leader: **Don Winget**

Office: RLM 16.336

Phone: (512) 471-3404

Research Educator/Contact: **Mike Montgomery**

Office: RLM 17.226

Phone: (512) 471-3451

Email: mikemon@astro.as.utexas.edu

URL: <http://rocky.as.utexas.edu/~mikemon/>

Teaching Assistant: **Keaton Bell**

Office: RLM 16.310

Phone: (512) 471-3462

Email: keatonb@astro.as.utexas.edu

Class meetings:

Lecture: F 3–4pm, RLM 7.116

Lab: M 1–5pm, W 10–12pm, Th 9–5pm, RLM 15.201

The Course:

You will participate in an active and ongoing research project using white dwarf stars to study the nature of dark matter, cosmochronology, and the physics of matter in extreme conditions. In this course we will go from the foundations of astronomy to the cutting edge of scientific research in astrophysics.

We will begin with an orientation to the field and will work on developing a grasp of the major components of scientific investigation as applied to astrophysics: observation, data acquisition, reduction, analysis and interpretation, instrumentation, numerical and physical experiment, and analytical theory. We will spiral through these areas as we go, developing skills and abilities as we deepen our understanding. The first half of the course you will do weekly labs designed to familiarize yourselves with our research and the relevant methods and techniques. The second half of the semester you will work in small groups on individual projects and present your results at the end of the semester.

It is mandatory that you obtain a lab book and that you use it to document your progress in the research portion of this course. Lab books will be checked regularly during the course and this will form part of your grade. In addition, you will hand in your lab book so that we may better evaluate progress on your research project and in the course in general.

Grades:

25% — individual labs

25% — participation and interaction

25% — notes and logbooks

25% — semester projects

Techniques: time series observations and analysis, CCD data reduction, frequency and fourier analysis, plotting and analysis of data, mathematical modeling of pulsations, numerical simulations of crystallization and convection

Note: As a general orientation to Astronomy classes at UT you should check out:

<http://www.as.utexas.edu/astronomy/education/memo.html>