

PHYS/AST 582 – High Energy Astrophysics

Spring 2019

MW 11:00-11:50 (and some Fridays)

Steward Observatory Library

Instructor:

Prof. Feryal Özel

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Office Hours: Wednesdays at 10, by appointment, or just drop by

Course Website:

Course material including handouts and notes will be posted on the D2L course website. You can find the syllabus, the schedule for the term (including any changes or updates to the schedule), handouts, and information about papers there.

Course Description:

This course will cover basics of high energy astrophysical sources and high-energy emission processes. It will have an emphasis on compact objects (neutron stars and black holes) and their high-energy environments and multiwavelength emission characteristics. We will also touch on X-ray emission from stars, galaxies, and clusters, and cosmic rays.

Classroom:

We will meet in the Steward Observatory library for all classes. Occasionally, we will have make-up classes on Fridays and the library is reserved for these dates as well. These classes are either already indicated in the schedule or will be announced.

Textbook:

There is no required textbook for this class. However, we will be reading a lot of current reviews and research papers. I will also put several books in reserve in the Steward library.

Grading Policy:

The course grade will be determined by class presentations, participation, and projects throughout the semester. There are no exams in this class.

Grading Scale:

A 90% overall grade will guarantee an A.

Incompletes will only be given if a student has satisfactorily completed the majority of the work in the class and has a valid reason, such as medical, for not completing the remainder of the course. Students must make arrangements with the instructor in order to receive an incomplete.

Assignments:

There will be weekly journal articles to read and some written assignments and computational projects throughout the semester. You are expected to come to class prepared to discuss the journal articles.

Class Schedule:

NO CLASS Jan 9 (AAS Meeting)

Mon Jan 14, Wed Jan 16

NO CLASS Mon Jan 21 (MLK), Wed Jan 23

Mon Jan 28, Wed Jan 30

Mon Feb 4, Wed Feb 6, Fri Feb 8 (make-up)

Mon Feb 11, Wed Feb 13

Mon Feb 18, Wed Feb 20

Mon Feb 25, Wed Feb 27

March 4-8: UA Spring Break, no class

Mon Mar 11, Wed Mar 13, Fri Mar 15 (make-up)

Mon Mar 18, Wed Mar 20

NO CLASS Mon Mar 25 (conference); Wed Mar 27, Fri Mar 29 (make-up)

NO CLASS April 1-5 (conference)

Mon Apr 8, Wed Apr 10

Mon Apr 15, Wed Apr 17

Mon Apr 22, Wed Apr 24

Mon Apr 29, Wed May 1

A tentative list of topics:

Scope of high energy astrophysics

Neutron Star Populations: pulsars, msps, p-pdot diagram, binaries

NS mass measurements

BH mass measurements

CC Supernovae

White dwarf interiors and cooling

ToV equations and polytropes

NS EoS – nuclear physics, radii, moment of inertia

Pulsar emission mechanisms

Fast Radio Bursts

Accretion

Accreting NSs and bursts

Emission processes in accretion disks

EHT

Gravitational waves – LIGO, LISA, PTAs

Short GRBs

Long GRBs

Particle acceleration

History and properties of X-ray telescopes

High energy emission from stars

Hot gas around galaxies

X-rays from clusters

Additional Information:

Students with disabilities who require accommodations to fully participate in course activities or meet course requirements are encouraged to register with the Disability Resource Center and contact us to discuss access issues.

Students are expected to follow all of the university-wide student policies, which are available at <http://catalog.arizona.edu>

Students are also expected to understand and follow the Student Code of Academic Integrity: <http://deanofstudents.arizona.edu/codeofacademicintegrity>

Other than grade and absence policies, the information contained in this syllabus may be subject to change with reasonable advance notice.

