# PHYS/AST 582 – High Energy Astrophysics

**Spring 2021**
**MoWe 10:00-11:15 am**
**Live Online instruction**
**Instructor: Feryal Ozel**
**Steward N322, 621-7096**
mailto:fozel@arizona.edu

**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, and zoom connection information on this course website.

**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. The course will consist of a mixture of lectures and student-led paper discussions.

**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 point to or post some books or chapters from books on the UA online library for reference and readings.

**Meeting Times.**— The class will meet Mondays and Wednesdays at 10:00-11:15 am via Zoom. The link and password are
`https://arizona.zoom.us/j/84239678598`
Password: astr582
You can also find this information and the schedule of classes on D2L.

**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 journal articles to read on some weeks and some written/computational projects throughout the semester. You are expected to come to class prepared to discuss all the journal articles and you will be asked to sign up to lead some of them.

**Class Schedule: (as of Jan 12)**
*NO CLASS Mon Jan 18 (MLK)*
*Wed Jan 20 (conference)*
*Wed March 10: UA "Spring Break"*
*Wed April 21: UA "Spring Break"*
May 5: last day of classes
Please check the website and class announcements for any updates to the schedule.

**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

**Policies —**
**Attendance.**— Class attendance is required. This is a high level elective that is based on in-class discussions and paper presentations. I ask that your camera be on whenever possible and please give your full attention and participate in the discussion.

All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion.

**Classroom environment.**— This is an inclusive classroom environment that is welcoming to students of all genders, races, ethnicities, ages, and backgrounds. You are expected to treat each other with respect and civility. No discriminatory language or behavior of any kind is welcome.

**Absences.**— If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
Please let me know if you will not be able to attend because of health reasons.
Campus Health is testing for COVID-19. Please call (520) 621-9202 before you visit in person.

Visit the UArizona COVID-19 page for regular updates.
Absences (or difficulty turning in assignments on time) that are pre-approved by the UA Dean of Students (or Dean's designee) will be honored.
There will be make up assignments or special arrangements with a well documented valid excuse.
**Life challenges.**— If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at 520-621-2057 or mailto:DOS-deanofstudents@email.arizona.edu.
**Physical and mental-health challenges.**— If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520-621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.
**Academic Integrity.**— Cheating or any other form of unethical or threatening behavior will not be tolerated. You can find more information on these issues in the following two web sites of the university:
`http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity`
`http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students`
**Accessibility and Accommodations.**— At the University of Arizona we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, illness, or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520) 621-3268 to explore reasonable accommodations.
**Incompletes.**— 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.
Other than grade and absence policies, the information contained in this syllabus may be subject to change with reasonable advance notice.