

# Course Syllabus

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AST 309G, Popular Astronomy

Spring 2020

Unique number 46165

CLASS MEETS: MWF 11-12 in PAI 3.02

INSTRUCTOR: Dr. Karl Gebhardt

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Office Hours: M 2-3, W 5-6, other times by appointment or stop by anytime

URL: (<http://www.as.utexas.edu/~gebhardt/a309s16/a309.html>) <https://utexas.instructure.com/courses/1268280>

TEACHING ASSISTANTS: Ching-Da Wu, Oshim Jain

Office Hours:

General Resources

[NASA \(http://www.nasa.gov\)](http://www.nasa.gov)

[Kepler \(http://kepler.nasa.gov\)](http://kepler.nasa.gov)

[Hubble \(http://www.stsci.edu\)](http://www.stsci.edu)

[Chandra \(http://chandra.harvard.edu\)](http://chandra.harvard.edu)

[SPITZER \(http://sirtf.caltech.edu/\)](http://sirtf.caltech.edu/)

[Picture of the Day \(http://antwrp.gsfc.nasa.gov/apod/astropix.html\)](http://antwrp.gsfc.nasa.gov/apod/astropix.html)

[Space Weather \(http://www.spaceweather.com/\)](http://www.spaceweather.com/)

[AstroArchive \(http://arxiv.org/list/astro-ph/new\)](http://arxiv.org/list/astro-ph/new)

[The Cosmic Perspective website \(http://www.astronomyplace.com\)](http://www.astronomyplace.com)

[NASA Watch \(http://www.nasawatch.com\)](http://www.nasawatch.com)

[ESO \(http://www.eso.org\)](http://www.eso.org)

[LHC \(http://lhc.web.cern.ch/lhc/\)](http://lhc.web.cern.ch/lhc/)

[LIGO \(http://www.ligo.org/\)](http://www.ligo.org/)

[Galaxy Images \(http://www.zsolt-frei.net/catalog.htm\)](http://www.zsolt-frei.net/catalog.htm)

On-line Astronomy News

[Space.com \(http://www.space.com\)](http://www.space.com)

[NY Times Science \(http://www.nytimes.com/pages/science/index.html\)](http://www.nytimes.com/pages/science/index.html)

[LA Times Science \(http://www.latimes.com/news/science/science\)](http://www.latimes.com/news/science/science)

[BBC Science \(http://news.bbc.co.uk/hi/english/sci/tech/default.htm\)](http://news.bbc.co.uk/hi/english/sci/tech/default.htm)

[Sky and Telescope \(http://www.skyandtelescope.com\)](http://www.skyandtelescope.com)

[SpaceRef \(http://www.spaceref.com\)](http://www.spaceref.com)

PREREQUISITES: None

**COURSE OBJECTIVES:** Astronomy receives considerable attention from the media and the public in general. It allows us to ask fundamental questions about who we are, where we come from, and where we will end up as a world. This course will concentrate on the areas of Astronomy that are currently most covered by the media---gravitational waves, cosmology, planet detection and interpretation, supermassive black holes, dark matter in the Universe, dark energy, and other significant developments that arise during the semester. We will cover each of these in depth, but will also concentrate on the reaction that the media has had on them. The media and public often have an uncanny ability to probe directly to the main reasons for why scientists study a particular problem. The student who completes this course will not only have a better scientific understanding of the current hot topics in Astronomy, but also understand how the media can actually drive science in general.

**TEXTS:** No textbook is required. Much of the relevant material will be articles that are available on the internet, so access to the internet is important. Lectures, along with many articles from the internet, will be provided online. I strongly recommend the book "Cosmic Perspective" by Bennett, Donahue, Schneider, and Voit for additional material. I will add websites to the lists below during the semester.

**GRADING:** The students final grade will consists of:  
10% homework, group assignments, class participation  
15% exam 1  
15% exam 2  
20% exam 3  
20% project  
20% quizzes

We will use +/- for grades: A is 95-100, A- 90-95, B+ 86-89, B 83-85, B- 80-82, etc. Any average below 60 is failing.

**EXAMS:** Exams 1-3 will consist of short answer and essay answer. The in-class quizzes will be short (15 minutes), testing conceptual understanding of recent material.

**HOMEWORK:** There will be about 5 homework and group assignments. These will be written assignments, internet activities, and in-class activities. All written assignments must be in computer-generated format - no handwritten work. Some of the assignments will involve problem-solving and math. Homework will be graded on presentation, style, and content.

**Projects:** The projects will be either a group presentation or group observing project. The details of the projects will be explained on a separate page. Each group should be composed of around 4 people. Many of the observing projects will involve the 9-inch refractor in Painter Hall.

**YOU BELONG HERE:** A climate conducive to learning and creating knowledge is the right of every person in our community. Bias, harassment, and discrimination of any sort have no place here. If you notice an incident that causes concern, please contact the Professor, TA, and the Campus Climate Response Team (<http://diversity.utexas.edu/crt> (<http://diversity.utexas.edu/crt>)).

**POLICIES:** There will be make-up examinations ONLY for students with valid excuses. The lowest quiz score will be dropped (so you can miss one quiz), otherwise no make-up quizzes unless you have a valid excuse. Also the lowest homework will be dropped.








Homework assignments will not be counted after the due date.



Class attendance and participation will be important to how you do in the class. Since we will not use a book, it is important to come to class. The calendar for the course is given below. I will try to stick the schedule as closely as possible. If any dates change, I will make the changes in this file so refer to this webpage for updates.

**WEB RESOURCES:** I will have plenty of resources listed on the course website for additional help and information. In particular, the suggested book has a website at <http://www.astronomyplace.com> that is very useful. They have study questions and guides for students. I highly encourage use of this website.



**RELIGIOUS HOLIDAYS:** By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

## Course Summary:

Date	Details	
Wed Jan 22, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1497189&amp;include_contexts=course_1268280">Introduction (https://utexas.instructure.com/calendar?event_id=1497189&amp;include_contexts=course_1268280)</a>	11am
Fri Jan 24, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1497191&amp;include_contexts=course_1268280">Gravity intro (https://utexas.instructure.com/calendar?event_id=1497191&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Jan 27, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1497194&amp;include_contexts=course_1268280">Gravity Theories (https://utexas.instructure.com/calendar?event_id=1497194&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Jan 29, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1497199&amp;include_contexts=course_1268280">Special Relativity (https://utexas.instructure.com/calendar?event_id=1497199&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri Jan 31, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1497205&amp;include_contexts=course_1268280">Special Relativity (https://utexas.instructure.com/calendar?event_id=1497205&amp;include_contexts=course_1268280)</a>	11am to 12pm
	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4921811">Quiz 1 (https://utexas.instructure.com/courses/1268280/assignments/4921811)</a>	due by 11am
Mon Feb 3, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499072&amp;include_contexts=course_1268280">General Relativity (https://utexas.instructure.com/calendar?event_id=1499072&amp;include_contexts=course_1268280)</a>	11am to 12pm

Date	Details	
Wed Feb 5, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499073&amp;include_contexts=course_1268280">General Relativity</a> (https://utexas.instructure.com/calendar?event_id=1499073&include_contexts=course_1268280)	11am to 12pm
	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930236">Homework 1</a> (https://utexas.instructure.com/courses/1268280/assignments/4930236)	due by 11:59pm
Fri Feb 7, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499074&amp;include_contexts=course_1268280">Gravity Waves</a> (https://utexas.instructure.com/calendar?event_id=1499074&include_contexts=course_1268280)	11am to 12pm
Mon Feb 10, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499075&amp;include_contexts=course_1268280">Gravity Waves</a> (https://utexas.instructure.com/calendar?event_id=1499075&include_contexts=course_1268280)	11am to 12pm
Wed Feb 12, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499076&amp;include_contexts=course_1268280">Black Holes, intro</a> (https://utexas.instructure.com/calendar?event_id=1499076&include_contexts=course_1268280)	11am to 12pm
Fri Feb 14, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499077&amp;include_contexts=course_1268280">Black Holes, observations</a> (https://utexas.instructure.com/calendar?event_id=1499077&include_contexts=course_1268280)	11am to 12pm
	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930249">Quiz 2</a> (https://utexas.instructure.com/courses/1268280/assignments/4930249)	due by 11:59pm
Mon Feb 17, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499078&amp;include_contexts=course_1268280">Black Holes, theory</a> (https://utexas.instructure.com/calendar?event_id=1499078&include_contexts=course_1268280)	11am to 12pm
Wed Feb 19, 2020	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930250">Exam 1</a> (https://utexas.instructure.com/courses/1268280/assignments/4930250)	due by 11:59pm
Fri Feb 21, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499079&amp;include_contexts=course_1268280">Dark Matter</a> (https://utexas.instructure.com/calendar?event_id=1499079&include_contexts=course_1268280)	11am to 12pm
Mon Feb 24, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499080&amp;include_contexts=course_1268280">Dark Matter</a> (https://utexas.instructure.com/calendar?event_id=1499080&include_contexts=course_1268280)	11am to 12pm
Wed Feb 26, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499082&amp;include_contexts=course_1268280">Dark Matter</a> (https://utexas.instructure.com/calendar?event_id=1499082&include_contexts=course_1268280)	11am to 12pm
Fri Feb 28, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499084&amp;include_contexts=course_1268280">Particles, Standard Model</a> (https://utexas.instructure.com/calendar?event_id=1499084&include_contexts=course_1268280)	11am to 12pm
Mon Mar 2, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499094&amp;include_contexts=course_1268280">Particles</a> (https://utexas.instructure.com/calendar?event_id=1499094&include_contexts=course_1268280)	12am
	 <a href="https://utexas.instructure.com/calendar?event_id=1499116&amp;include_contexts=course_1268280">(https://utexas.instructure.com/calendar?event_id=1499116&amp;include_contexts=course_1268280)</a>	11am to 12pm

Date	Details	
Wed Mar 4, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499095&amp;include_contexts=course_1268280">Particles (https://utexas.instructure.com/calendar?event_id=1499095&amp;include_contexts=course_1268280)</a>	11am to 12pm
	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930461">Quiz 3 (https://utexas.instructure.com/courses/1268280/assignments/4930461)</a>	due by 11:59pm
Fri Mar 6, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499096&amp;include_contexts=course_1268280">Galaxy Evolution (https://utexas.instructure.com/calendar?event_id=1499096&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Mar 9, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499097&amp;include_contexts=course_1268280">Galaxy Evolution (https://utexas.instructure.com/calendar?event_id=1499097&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Mar 11, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499098&amp;include_contexts=course_1268280">Galaxy Evolution (https://utexas.instructure.com/calendar?event_id=1499098&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri Mar 13, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499099&amp;include_contexts=course_1268280">Galaxy Evolution (https://utexas.instructure.com/calendar?event_id=1499099&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Mar 23, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499103&amp;include_contexts=course_1268280">Telescopes (https://utexas.instructure.com/calendar?event_id=1499103&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Mar 25, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499104&amp;include_contexts=course_1268280">Telescopes (https://utexas.instructure.com/calendar?event_id=1499104&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri Mar 27, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499105&amp;include_contexts=course_1268280">Universe Evolution (https://utexas.instructure.com/calendar?event_id=1499105&amp;include_contexts=course_1268280)</a>	11am to 12pm
	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930462">Quiz 4 (https://utexas.instructure.com/courses/1268280/assignments/4930462)</a>	due by 11:59pm
Mon Mar 30, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499111&amp;include_contexts=course_1268280">Universe Evolution (https://utexas.instructure.com/calendar?event_id=1499111&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Apr 1, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499112&amp;include_contexts=course_1268280">Universe Evolution (https://utexas.instructure.com/calendar?event_id=1499112&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri Apr 3, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499113&amp;include_contexts=course_1268280">HETDEX (https://utexas.instructure.com/calendar?event_id=1499113&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Apr 6, 2020	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930251">Exam 2 (https://utexas.instructure.com/courses/1268280/assignments/4930251)</a>	due by 11:59pm
Wed Apr 8, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499114&amp;include_contexts=course_1268280">HETDEX (https://utexas.instructure.com/calendar?event_id=1499114&amp;include_contexts=course_1268280)</a>	11am to 12pm

Date	Details	
Fri Apr 10, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499115&amp;include_contexts=course_1268280">Dark Energy (https://utexas.instructure.com/calendar?event_id=1499115&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Apr 13, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499108&amp;include_contexts=course_1268280">Dark Energy (https://utexas.instructure.com/calendar?event_id=1499108&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Apr 15, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499092&amp;include_contexts=course_1268280">Early Universe (https://utexas.instructure.com/calendar?event_id=1499092&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Apr 15, 2020	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930476">Quiz 5 (https://utexas.instructure.com/courses/1268280/assignments/4930476)</a>	due by 11:59pm
Fri Apr 17, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499088&amp;include_contexts=course_1268280">Early Universe (https://utexas.instructure.com/calendar?event_id=1499088&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Apr 20, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499110&amp;include_contexts=course_1268280">Early Universe (https://utexas.instructure.com/calendar?event_id=1499110&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed Apr 22, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499109&amp;include_contexts=course_1268280">String Theory (https://utexas.instructure.com/calendar?event_id=1499109&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri Apr 24, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499118&amp;include_contexts=course_1268280">String Theory (https://utexas.instructure.com/calendar?event_id=1499118&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Apr 27, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499093&amp;include_contexts=course_1268280">String Theory (https://utexas.instructure.com/calendar?event_id=1499093&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon Apr 27, 2020	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930464">Quiz 6 (https://utexas.instructure.com/courses/1268280/assignments/4930464)</a>	due by 11:59pm
Wed Apr 29, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499119&amp;include_contexts=course_1268280">Universe Models (https://utexas.instructure.com/calendar?event_id=1499119&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri May 1, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499087&amp;include_contexts=course_1268280">Universe Models (https://utexas.instructure.com/calendar?event_id=1499087&amp;include_contexts=course_1268280)</a>	11am to 12pm
Mon May 4, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499086&amp;include_contexts=course_1268280">Crazy Ideas (https://utexas.instructure.com/calendar?event_id=1499086&amp;include_contexts=course_1268280)</a>	11am to 12pm
Wed May 6, 2020	 <a href="https://utexas.instructure.com/calendar?event_id=1499117&amp;include_contexts=course_1268280">Crazy Ideas (https://utexas.instructure.com/calendar?event_id=1499117&amp;include_contexts=course_1268280)</a>	11am to 12pm
Fri May 8, 2020	 <a href="https://utexas.instructure.com/courses/1268280/assignments/4930253">Exam 3 (https://utexas.instructure.com/courses/1268280/assignments/4930253)</a>	due by 11:59pm



