



## ASTR 503 – Galactic Astronomy COURSE SYLLABUS: Spring 2018

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### WHO I AM

**Instructor:** Dr. Kurtis A. Williams, Associate Professor

**Office Location:** Science 145

**Office Phone:** 903-886-5516

**Office Fax:** 903-886-5480

**Office Hours:**

Science 145: Tues 9:30-10:30, Wednesday 9:30-10:30, or by appointment

Science 111 (Peer Learning Lab): Thurs 2:45-3:45

**Course Locations and Times:**

Flex term course, meets Febr 1 through May 11.

Meeting time & place TBD

**University Email Address:** [Kurtis.Williams@tamuc.edu](mailto:Kurtis.Williams@tamuc.edu)<sup>†</sup>

**Preferred Form of Communication:** Email or Remind chat

**Response Time:** 24 hours on weekdays

### WHAT THIS COURSE IS ABOUT

**Course Description:**

Observations of galaxies provide much of the key evidence supporting the current paradigms of cosmology, from the Big Bang through formation of large-scale structure and the evolution of stellar environments over cosmological history. In this course, we will explore the phenomenology of galaxies, primarily through observational support of underlying astrophysical theory.

**Student Learning Outcomes:**

1. You will calculate properties of galaxies and stellar systems given quantitative observations, and vice-versa.
2. You will be able to categorize galactic systems and their components.
3. You will be able to interpret observations of galaxies within a framework of galactic and stellar evolution.
4. You will prepare written and oral summaries of both current and fundamental peer-reviewed articles on galactic astronomy for your peers.

## WHAT YOU ABSOLUTELY NEED

### Materials – Textbooks, Software and Additional Reading:

#### Text Required:

Extragalactic Astronomy & Cosmology, 2<sup>nd</sup> Edition by Peter Schneider, Springer

#### Recommended texts:

Allen's Astrophysical Quantities, 4<sup>th</sup> Edition, Edited by Arthur N. Cox, Springer – Recommended for those pursuing PhDs in astronomy.

#### Required Equipment:

Access to a desktop or laptop computer on which you can install software, read PDF files, compile code, and access the internet.

#### Course Prerequisites:

Advanced undergraduate classical dynamics (equivalent of Phys 411) or Phys 511.

## HOW THE COURSE WILL WORK

### Instructional Methods / Activities / Assessments

#### Assigned Reading

There is far too much material in the text for us to cover every single topic in class. For this reason, I will assign reading often. To encourage you to complete the readings, simple written assignments will accompany reading assignments and be due before lecture. These written assignments are graded based on whether you address each topic thoughtfully.

#### Attendance and Participation

Research into how people learn shows that the best learning comes from interaction. Simply reading material and listening to me drone on won't help you learn anything useful. I therefore will require you to participate actively in the course.

Participation will come in many guises, including in-class discussions, problem-solving exercises and in-class presentations. I expect you not only to attend class, but to contribute thoughtfully to these activities. If you have not done the required reading, you will find this difficult.

For each class in which you attend and are an active participant, you will receive one participation at the point. Your participation grade will be based on the fraction of participation points which you earned.

Absences will be excused on a case-by-case basis.

#### Homework

Homework will be assigned often. These homework sets will consist of qualitative and quantitative questions. Many of these questions will require you to synthesize multiple topics in order to get the correct answer, and some will be quite difficult.

Homework grades will be based not just on correct answers, but also on the thought process

behind each answer – rather than turning in pages of manipulations of a formula, do you also describe your overall strategy and your individual steps such that someone who does not know the question can follow what you are doing? This is an important aspect of the scientific method – documenting your thoughts and process so that others can replicate your results.

Due dates for individual assignments will be given with each assignment. Late assignments will be penalized by 10% per day late.

Collaboration is a crucial skill in the sciences, and so I encourage you to work together on homework sets, including strategies of attacking a problem and mathematics. When you work together, it is incumbent on each of you to make sure that you personally understand where these strategies and solutions come from, and what their implications are. This means that you should each turn in your own work, and not simply copy from the person who thinks they got the correct answer! The following are considered cheating and will not be tolerated: Searching for answers on the internet, obtaining copies of solutions to homework questions (whether from past students, online, or other sources), directly copying another student's work, etc. See the section on "Academic Integrity" below for full details.

### **Presentations:**

At least three times during the course you will be assigned to read a peer-reviewed article to present to the class as a 15-minute talk. These articles will be important papers chosen from past and present astrophysical literature to highlight the development and current state of some of the topics we cover in the course. The goals of these presentations are three-fold: to hone your skills of reading astrophysical research papers, to give you practice in presenting astrophysical research in front of an audience, and to introduce you to seminal papers which any galactic astronomer worth their salt has read.

You will always be given at least one week's lead time on a presentation you will make; all students should read each paper and be prepared to discuss the paper following the presentation.

## **Grading**

Grading is on an absolute scale with no competition. If you all earn an A, you all get an A. I may "curve" grades for specific assignments at my discretion; your percentage earned will never go down if I apply such a curve. Your current grades will be available through the gradebook on eCollege.

Grading is weighted by assignment using the following weights:

<b>Assignment Type:</b>	<b>Weight:</b>
Attendance / Participation	10%
Homework Assignments	50%
Presentations	25%
Reading Assignments	15%

The grading scale is:

<b>Percentage Range</b>	<b>Letter</b>
90% to 100%	A

80% to 89%	B
70% to 79%	C
60% to 69%	D
Below 60%	F

## HELP!!!!

### Are you lost, confused, or worried?

First, **DON'T PANIC!**

Next, step back and try and pinpoint the source of your confusion:

- Have you read the textbook sections? If not, go read them! If you have, maybe you need to try a different reading methods. Science textbooks and journal articles are not like novels; they present information in a completely different method than most reading material, and there is no plot thread unfolding as you get further into a chapter. Here are some websites with suggestions on how to read science textbooks:
  - How to Read Effectively in the Sciences: <http://academic.cuesta.edu/acasupp/AS/621.htm><sup>†</sup>
  - Reading Assignments in Science: <http://www.studygs.net/science/readingtexts.htm><sup>†</sup>
  - The SQ4R Method for Reading: <http://scs.tamu.edu/?q=node/105><sup>†</sup>
- Do you just need some time away? Astronomy is too much to deal with all at once. Work on the assignment over the week and give your brain some time to absorb and mull over the information. In particular, don't wait until the deadline to do your homework! You can start your homework do a few problems, go away a couple days, and pick up where you left off, and not lose any points.
- If after all of this you are still confused or uncertain, it's time to seek help. Don't wait until the exam! Here you have many options:
  - Talk to your classmates
  - Attend my office hours (see next section). You can come to any of the scheduled times or make an appointment with me if none of those times work.
  - If you are still stuck, contact the Academic Success Center to search for other options that may help you. <http://www.tamuc.edu/studentLife/campusServices/academicSuccessCenter/><sup>†</sup>
  - Go to the online One Stop Shop created to serve you by attempting to provide as many resources as possible in one location. <http://www.tamuc.edu/admissions/onestopshop/><sup>†</sup>

### Are you experiencing technical difficulties?

If you are having problems with online materials such as eCollege or accessing journal articles, please contact Dr. Williams as soon as possible.

Personal computer problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, an Internet cafe, or a bookstore, such as Barnes & Noble, etc.

## **If your problems are with myLeo:**

Your myLeo email address is required to send and receive all student correspondence. Please email [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu)<sup>†</sup> or call us at 903-468-6000 with any questions about setting up your myLeo email account. You may also access information at [myLeo](https://leo.tamuc.edu)<sup>†</sup>. <https://leo.tamuc.edu><sup>†</sup>

## **HOW TO CONTACT ME AND STAY CONNECTED**

### **Interaction with Instructor**

#### **Email:**

I can be reached by email at [Kurtis.Williams@tamuc.edu](mailto:Kurtis.Williams@tamuc.edu)<sup>†</sup>. It may take me up to 24 hours to send you a response (48 hours on the weekend or holidays). If you don't hear back from me in that time, please send another email or give me a call. I assume you check your campus email daily, so if I send out a class email, I'll assume you read it.

#### **Texts and Email Announcements:**

I have set up an SMS (text and/or email) account for brief messages, like reminders of due dates, updates on class events, and other crucial messages. I expect you to make use of this service.

To register for text (SMS) updates, text “@astr503” (without quotes) to 81010 or (754) 333-5306. The service is free, but any standard messaging fees charged by your mobile provider will apply. To get automated email copies of any texts (like if you don't have texting or don't want to pay for it), send a blank email to: [astr503@mail.remind.com](mailto:astr503@mail.remind.com)<sup>†</sup>. The service is also private: nobody (including myself) will see your phone number or email, and only I can send messages.

#### **Office Hours:**

Office hours are times that I set aside when I promise to be in my office so that you can come by and talk to me. During office hours, you can ask questions about the course material, ask about homework, see your current grade, or ask other questions about the class or astronomy in general. Office hours work best if you have your textbook and class notes with you.

It's important to realize that office hours are *not* just for students who are having problems in the course. If you are uncertain about anything, please visit, email, phone or drop into virtual hours before your small problems grow into big ones. If you are worried about what might be on the test, stop in. If you are curious about astronomy jobs and research, come by.

If you want to talk but cannot come during office hours, please contact me by email in order to set up an individual appointment. By setting an appointment, you both guarantee that I will be in my office (or online) and that I will have plenty of time to talk with you. You may feel free to stop by my office any time my door is open, but if you do not have an appointment and if it is not my scheduled office hours, please understand if I'm not free to talk.

#### **Netiquette**

I expect all students to behave to basic standards of etiquette on the web (and in real life). Abusive or inappropriate comments will be removed and earn a reprimand; any additional lapses

could result in disciplinary action. For a simple guide to netiquette, see <http://www.albion.com/netiquette/corerules.html>

## RULES, RULES, RULES (UNIVERSITY POLICIES)

### Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

### Academic integrity

A major goal of this and most every university course is for you to learn and appreciate subject material. Academic dishonesty (“cheating”) actively prevents you from achieving this goal. Academic dishonesty is taken seriously by the University and by me, and ***will not be tolerated.*** (See the TAMU-C Code of Student Conduct and the TAMU-C Procedures A 13.04, 13.12, 13.31, and 13.32.)

This conduct is not only considered wrong in this course and at this University, but also in the real world. Engaging in these activities will get you fired from a job and prevent you from getting another job.

Unethical student conduct includes:

- **Plagiarism**, or copying the words of others with the intent of making it look like your own. Whether you use someone else’s phrase word for word, or whether you try and change a few words, or even if you just borrow someone else’s original idea and don’t give them credit, that’s unethical. Use your own words whenever possible, give credit to wherever you got an idea, and put direct quotes inside quotation marks.
- **Cheating** involves trying to trick me or others into thinking you did work that you really didn’t do, or into thinking you know what you really don’t know. This can include stealing exams, changing your answers on a graded exam or assignment and claiming it was graded wrongly, putting your name on someone else’s homework, and so on.
  - ***Searching the Internet and simply cutting/pasting the text you find is considered cheating.*** Searching the Internet for help on a topic is okay. For example, suppose a question asks “Describe the life cycle of a star that has the same mass as the sun.” Typing that phrase into Google and cutting and pasting the text in the answer box is considered cheating. Typing “star life cycles” into Google, reading a few web pages, and summarizing the information in your own words is not cheating.
  - ***Borrowing a previous student’s homework, exams, or solution sets is considered cheating.*** “Borrowing” includes looking at someone’s submitted homework, screen shots, stealing returned homeworks, and so on.
- **Collusion** is working with another person to cheat. This can include copying someone else’s answers to an exam or assignment, doing work for another student, buying or otherwise obtaining homework/exam solutions from any source online or off-line, or any other instance of multiple people engaging in some form of cheating

or dishonesty. Working with other students on an assignment is fine as long as everyone contributes and each student does their own work.

- **Any other activity that, to a reasonable person, looks wrong.** If you have any doubt whatsoever whether a certain action is considered dishonest, please ask me *before* engaging in the activity. There is no need to be embarrassed about asking, and I won't penalize you for asking! In this class, if you follow the maxim "it's easier to beg forgiveness than to ask permission", don't expect forgiveness to be forthcoming.

***If you engage in academic dishonesty during any graded activity, you will receive no credit for that activity. More than one instance of dishonesty by a student will result in automatic failure of the course and referral of the student for disciplinary action.***

For further information, search the Texas A&M-Commerce website for "academic integrity policy".

## **Administrative Withdrawal**

Although I have the right to drop you for excessive absences, I won't do so. You have a right to get an F if you decide to quit working but don't withdraw.

## **Assignment Policy and Due Dates**

Assignments and due dates will be announced in class and posted on eCollege in the main page for each unit. Submission requirements for each assignment will also be given on that page.

## **Dropping The Course**

A student may drop this course by logging into their myLEO account and clicking on the hyperlink labeled 'Drop a class' from among the choices found under the myLEO section of the Web page.

## **Harassment Policy**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here:

University Title IX Contact: Michele Vieira, 903-886-5025, <mailto:TitleIX@tamuc.edu><sup>†</sup>

### **University resource webpages:**

<http://www.tamuc.edu/facultyStaffServices/humanResources/title-ix/resources.aspx><sup>†</sup>

<http://www.tamuc.edu/campuslife/campusServices/universityPoliceDepartment/crimePrevention/sexualAssault.aspx><sup>†</sup>

University Counseling Center: 903-886-5145,

<http://www.tamuc.edu/campusLife/campusServices/counselingCenter/default.aspx><sup>†</sup>

Campus police: <mailto:upd@tamuc.edu><sup>†</sup>, call 911 in emergency situations

**External resources:**

Crisis center of NorthEast Texas: <http://www.ccnex.org><sup>†</sup>

Know your IX: <http://knowyourix.org><sup>†</sup>

End rape on campus: <http://endrapeoncampus.org><sup>†</sup>

Clery Center for Security on Campus: <http://clerycenter.org><sup>†</sup>

Not Alone: <https://www.notalone.gov><sup>†</sup>

**Incompletes**

I only offer incompletes in extraordinary circumstances. Any student interested in an incomplete should contact me as soon as possible after the situation arises, and should keep in mind that I am not required to give you an incomplete and so may not offer you the opportunity. You should also know that you only have access to an eCollege course for two weeks following the final day of term.

**Late Work**

Late assignments are penalized 10% for each day late (including weekends), up to 70% penalty. After 7 days, any missing assignments will receive a zero. If you fail to take an exam, you will receive a zero.

**University Specific Procedures****Nondiscrimination Notice**

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

**ADA Statement**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services**

**Texas A&M University-Commerce**

**Gee Library**

**Room 162**

**Phone (903) 886-5150 or (903) 886-5835**

**Fax (903) 468-8148**

[StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)<sup>†</sup>

**Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook*).

### **Campus Concealed Carry**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to <http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf><sup>†</sup> and/or consult your event organizer. Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

## **COURSE OUTLINE / CALENDAR**

The course will cover many of the topics outlined below. Official dates will be given as the class progresses.

- Unit 1: Electromagnetic Radiation (Appendix A)
- Unit 2: Stellar Properties (Appendix B)
- Unit 3: The Milky Way (Chapter 2)
- Unit 4: Galaxy Morphology and Scaling Relations (Chapter 3.1 – 3.4)
- Unit 5: Galaxy Evolution (Chapter 3.5 – 3.8)
- Unit 6: Observational Cosmology (Chapter 3.9 – 3.11)
- Unit 7: Cosmology (Chapter 4 and Chapter 8)
- Unit 8: Dark Matter (Chapter 7)
- Unit 9: Groups and Clusters of Galaxies (Chapter 6)
- Unit 10: Active Galactic Nuclei (Chapter 5)