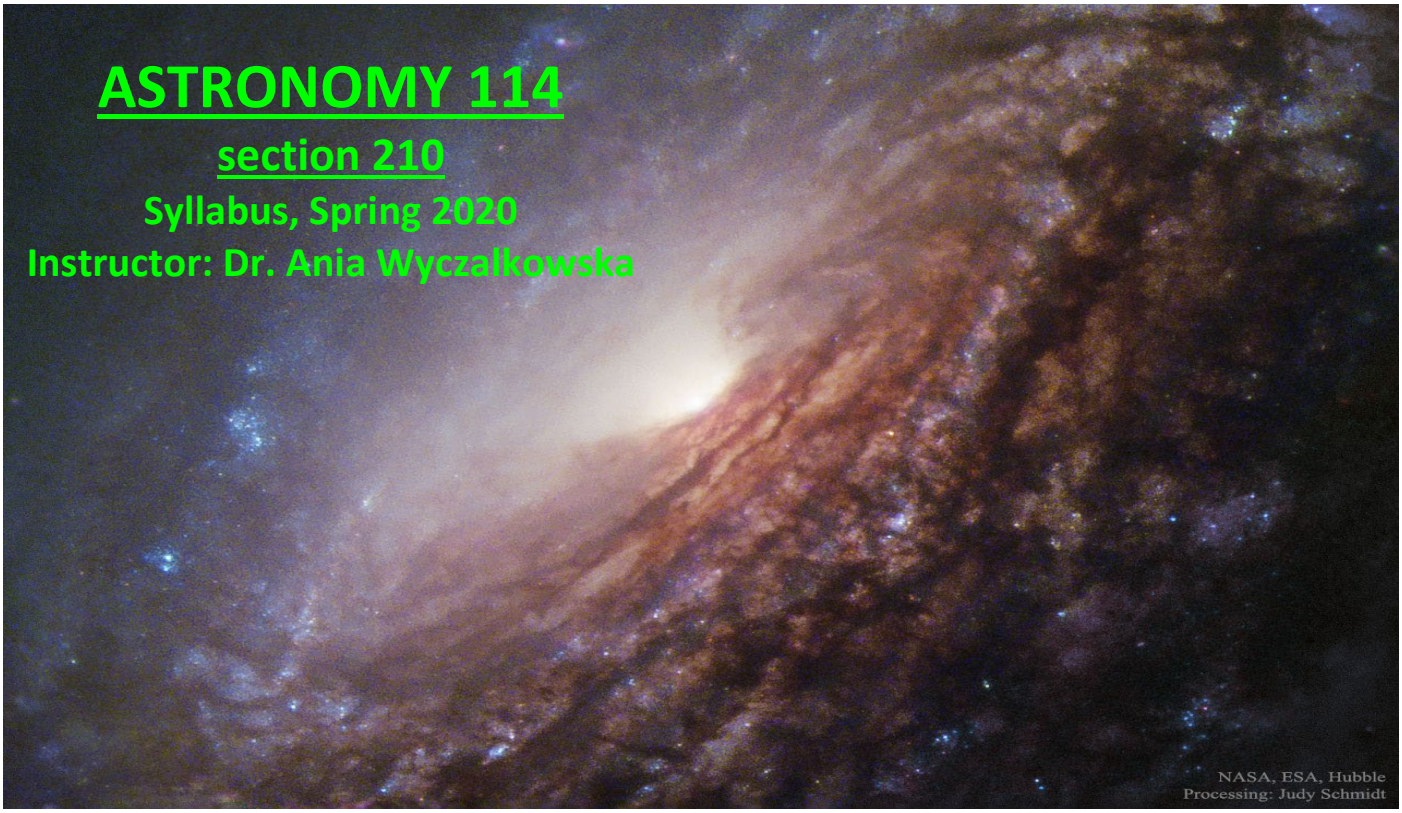

Contact information:

office: **327 Planetary Hall,**
phone: **× 34166**
e-mail: awyczalk@gmu.edu
office hours: **Monday 5:00 PM – 6:00 PM**
Wednesday 12:00 PM – 1:00 PM (or by appointment).

Note: my office hours may be subject to adjustment as my other obligations get scheduled at the start of the semester.

Office hours are generally conducted on a first come first serve basis. You are encouraged to come visit me if you are having any problems with the course, have questions about the material we cover or any questions about astronomy in general! It would help me if we schedule a time to meet in advance, so that I can be sure to be available and plan to allow sufficient time for discussion. If you need to see me and are not able to come during my regularly scheduled office hours, please make an appointment. I'm not able to accept walk-ins. If, for an unexpected reason, I am not able to be there during any of the regularly scheduled office hours, I will post an announcement on Blackboard and/or leave a note on my office doors.

contacting me:

This is not the only I teach this semester and some of them are very large. So, first of all, if you're mailing me please include the information that you are in my ASTR 114 class. Anything that is not of personal nature should be communicated via the discussion board. If you have course-related questions, it is likely that your classmates may want to ask the same so, please check the discussion board first for similar queries and, if your questions aren't already answered there, post them. Personal issues are best handled in person, so stop by during my office hours or make an appointment. I will not discuss individual grades, help you with your homework, discuss your test performance, or anything else that's lengthy, by e-mail. For that you'll need to come see me.

Please allow at least 72 hours for responses both to mail and the discussion board. Note that at times it is not possible for me to answer all emails, particularly if I receive a real large number of them. Bottom line: while I'll do my best to be accessible to you, I need your cooperation to keep the amount of mail at a reasonable level. At the same time, if you do not get a reply from me within 72 hours, please assume that

your mail got buried and re-send it. (Also, please do not use the Blackboard e-mail function. E-mails sent through Blackboard get bundled all together and sometimes do not show as new. You are more likely to get a timely answer if you do not use the Blackboard system.)

EDUCATIONAL GOALS: The general education natural sciences courses engage students in scientific exploration; foster their curiosity; enhance their enthusiasm for science; and enable them to apply scientific knowledge and reasoning to personal, professional and public decision-making. Astronomy 114 does this within the content of stellar and galactic astronomy. During the lab class students should:

- Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding:
  - evolves based on new evidence
  - differs from personal and cultural belief

- Recognize the scope and limits of science

- Recognize and articulate the relationship between the natural sciences and society and the application of science to societal challenges (e.g., health, conversation, sustainability, energy, natural disasters, etc.)

- Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information)

- Participate in scientific inquiry and communicate the elements of the process, including:
  - Making careful and systematic observations
  - Developing and testing a hypothesis
  - Analyzing evidence
  - Interpreting results

OBJECTIVES: This laboratory is the companion to Astronomy 113: Stars and Galaxies. It is designed to reinforce the concepts presented in the lecture course through hands-on experimentation and realistic computer simulations. These tools and techniques should help learners better understand what astronomers know about the universe and how they came to know it. A series of labs will prepare students for a final project in which they analyze and identify an unknown sky object and present their findings in a summary paper.

Other labs will help students develop skills in graphing, scientific reasoning, and critical thinking that may transfer to other areas of study and interest.

ACCESS TO MATERIALS AND COMPLETED LAB EXERCISES:

Lab exercises, pre-lab materials, answer sheets and supplementary materials, including links to helpful websites, will be delivered via Blackboard and should be read in advance of each week's class. Be sure to check Blackboard for updates and announcements each week before coming to class.

Save your work as you go and make sure you send a copy to each team member before submitting to ensure each can review as needed. Erase the file from the computer after submission is complete.

LAB PROCEDURES: Much of the time in lab you will be working in small groups. Be sure that you have contact information for your lab partners and that you come each week prepared to do the complete lab. Lab write-ups are due at the end of each class period and will usually be returned to you the following week. Some portion of most labs will be collaborative work; other parts will be identified as individual. Pre-labs

quizzes, conclusion questions, and the final practical exam are individual assignments and must be done without consulting other students.

Prepare for each lab before coming to class by reading the lab and pre-lab materials, as well as relevant material about the topic from the course textbook. You may find labs cover a topic before it is covered in lecture, so it is important that you prepare in advance.

GRADING:

Laboratory exercises: The laboratory exercises will help you understand how astronomers gather information about celestial objects and will augment the material from your lecture about concepts in stellar astronomy. You will use simulated optical and radio telescopes along with simulated photometers and spectrometers to help you understand and analyze what you see. You must complete 9 in-class labs and an out of class lab. There is one make-up lab at the end of the semester. You may use it to replace your lowest scoring lab, or one you missed (but it won't replace the practical or the observing session, out of class lab)

Practical exam: The practical exam, Identifying Object X, is mandatory and will serve as a test of your understanding of how astronomers use various techniques to understand objects we see in the sky. In order to complete this lab exam successfully you **must** complete and understand the labs indicated in the schedule with bold type. This is an individual effort, you will be assigned a time to come to lab to research the object, then will write up a report describing your research and the results and submit it within a week of taking the exam.

Quizzes and pre-labs: Pre-labs are included with the lab materials. Read this material, refer to relevant material in the text and then take the pre-lab quiz, due the night before your lab meeting.

Observatory visit:

GMU observatory in Research hall. The telescope is the dome on top of the "silo" to the right, but go into Research Hall through the revolving door on the left to reach the elevators that take you up to the top.

A visit to the GMU observatory is an out-of-class lab and is mandatory. Your instructor will give you instructions about how to sign up for your visit which will last about half an hour to 30 minutes. On your sign-up date, gather at the elevators in Research Hall. A guide will meet you and take you to the GMU telescope on the top floor. You must write a report detailing your visit, as outlined in instructions on the Blackboard page for your class. The report is due the week following your visit. For more information about the telescope and procedures for https://cos.gmu.edu/observatory/.

Final grade: Grades from the above assignments will determine your final grade as follows:

Graded elements	Possible points
Observatory visit - out-of-class lab - write-up of your preparation for tour of the GMU observatory and of your tour experience and observations	10
Lab reports. 9 regular in-class labs. A missed lab counts 0 points. The labs indicated in bold type are required to prepare for the Lab Practical Exam.	90
Lab Practical - Identifying Object X – Collect data in lab and submit your write-up explain how you approached the problem and the results of your investigation	10
Pre-lab quizzes – All pre-lab quizzes are due before class. Missing or late pre-lab quizzes are scored 0.	10
Total	**120**
11th Lab – A lab to earn one lab credit for students who missed a lab due to exceptional circumstances, or for those who wish to replace the lowest scoring lab of the 9 regular labs.	10 Replaces a missed lab or low scoring lab (NOT the practical exam or the out-of-class observatory visit)

Each lab missed will lower your grade by approximately one letter grade. Missing 4 labs or more will result in automatic failure. Labs cannot be made up except under exceptional circumstances. No work will be accepted after the last regular class meeting. The score of A+ is not automatic, instructors may award it for students who have shown exceptional effort and achieved a final score of 116.5 points or above. There is no extra credit, the grade depends solely on work done during the regular semester.

Letter Grade	Required points
A	111.6-120
A-	108-111.59
B+	104.4-107.99
B	99.6-104.39
B-	96-99.59
C+	90-95.99
C	84-89.99
C-	80.4-83.99
D	72-80.39
F	71.99 and below

LABORATORY CONDUCT:

Cell Phones: Inappropriate (not class related) use of personal or lab electronic devices may result in being sent out of lab.

Computer Use: The computers in the lab room are for class work only. Students using web or email services that are not class related may have access to the web blocked. You may not use computers to work on assignments for other classes. ***Please DO NOT turn the computer off when you finish.***

Personal computers: Personal computers may be used only with instructor's permission and only for lab work. You may not disconnect lab equipment to plug in a personal electronic device.

Group work: Most of the work in astronomy lab occurs in small groups. It is important for all students in the group to take part. Students who arrive late or leave early may lost part of the lab grade if they have not contributed sufficiently to the work and final report. As a matter of academic integrity every student should be able to account for what they contributed to the work of the group.

Classroom courtesy: Use the lab time to work on astronomy. Students who disrupt the classroom with loud, inappropriate, or off-topic conversations may be asked to leave the lab after a warning. Show courtesy to

your fellow students and to your instructor by giving whole-hearted attention to the topic at hand. *Before leaving the lab, clear your work station and push the computer keyboard and chair back in place, but **DO NOT** turn off the computer!*

Food and drink: Food and drink are NOT permitted in the Astronomy lab during regularly scheduled lab sessions.

Visitors: You may not bring visitors to the astronomy lab with you, even if they are students enrolled in other sections of the course. You may not complete your work or make up missed labs in sections in which you are not enrolled. You must attend the section in which you are enrolled in order to get credit for the class.

POLICIES:

Withdrawal: If you need to withdraw from this course you must do it within the University established time frame. Check Patriot web for important dates.

Students with Disabilities: Please contact the Office of Disability Services (SUB I, Room 222, Phone 703-993-2474, http://ods.gmu.edu/) if you have a learning or physical disability that will need accommodation in the astronomy laboratory. Instructors may not make accommodations without the appropriate paperwork.

Honor Code: Student members of the George Mason University community pledge not to **cheat**, **plagiarize**, **steal**, and/or **lie** in matters related to academic work. For more information and definitions of the terms above go to http://oai.gmu.edu/the-mason-honor-code-2/. Group work is important in the lab, and part of doing this work honestly is doing your part and giving team mates credit for theirs. Work that is directly copied from the work of others in this class or any other section will be subject to referral to the honor court.

Safety and security: The provost's office has set up a system for notifying students and staff of emergencies. You can sign up for emergency messages to your cell phone by going to https://ready.gmu.edu/masonalert/. Call 911 in case of life-threatening emergencies in the classroom.

GMU email account: Students must activate their GMU email accounts to receive important University information, including messages related to this class. Course information will usually be conveyed through Blackboard. Please use the Blackboard email function as your primary means of communicating with the instructor in this class. For more information, see MasonLive (Student email) at https://itservices.gmu.edu/services/services-students.cfm.

Other useful campus resources:

Writing Center: A114 Robinson Hall; (703) 993-1200; http://writingcenter.gmu.edu
University Library: "Ask a Librarian" http://library.gmu.edu/ask
Counseling and Psychological Services (CAPS): (703) 993-2380; http://caps.gmu.edu
University Policies: The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty and staff conduct in university affairs

Schedule of Labs and Quizzes

This is a general schedule for all sections. Each section will cover the same material during the designated week. The specific time and day depends on the section for which you are registered. Pre-lab exercises and quizzes are always due on Blackboard at 9 PM on the night before your scheduled lab meeting.

Labs highlighted in bold are critical for the lab practical exam, identifying a celestial object.

Week of	Lab
Will vary	*Observatory quiz due at 11:59 PM the night before your observatory visit*
Will vary: individual choice of sessions	GMU Observatory out-of-class lab – must be completed during time frame designated for your section – tours begin the week of February 6, you must sign up for one of the tours assigned to your section or attend Monday night public tour.
20 Jan	Introduction to the lab
	Attend this first lab meeting or risk being dropped from the section
27 Jan	Scale of the Milky Way and Star Wheel
	Atomic spectra pre-lab quiz due at 11:59 PM the night before your section meets
3 Feb	**Atomic Spectra lab**
	Stellar classification pre-lab quiz due at 11:59 PM the night before your lab
10 Feb	**Stellar Classification lab**
	Hertzsprung-Russell pre-lab and quiz due at 11:59 PM the night before your lab
17 Feb	**The Hertzsprung-Russell Diagram lab**
	Photoelectric Photometry of the Pleiades pre-lab quiz due at 11:59 PM the night before your lab
24 Feb	**Photoelectric Photometry of the Pleiades lab**
	Variable stars pre-lab quiz due at 11:59 PM the night before your lab
2 Mar	Variable Stars lab
9 Mar	***SPRING BREAK***
	Radio Astronomy of Pulsars pre-lab quiz due at 11:59 PM the night before your lab
16 Mar	Radio Astronomy of Pulsars lab
	Galaxy Analysis and Identification pre-lab quiz due at 11:59 PM the night before your lab
23 Mar	Galaxy Analysis and Identification lab
	Hubble red-shift pre-lab quiz due at 11:59 PM the night before your lab
30 Mar	Hubble Red-shift lab
	Object X pre-lab quiz due at 11:59 PM the night before your lab
6 Apr	**Lab Practical Exam - Group 1 – Identifying Object X –Mandatory**
	Object X pre-lab quiz due at 11:59 PM the night before your lab
13 Apr	**Lab Practical Exam – Group 2 – Identifying Object X – Mandatory**
	Quiz for lab 11 due at 11:59 PM the night before your lab
20 Apr	Make-up lab
No Final exam for Astronomy 114 lab	