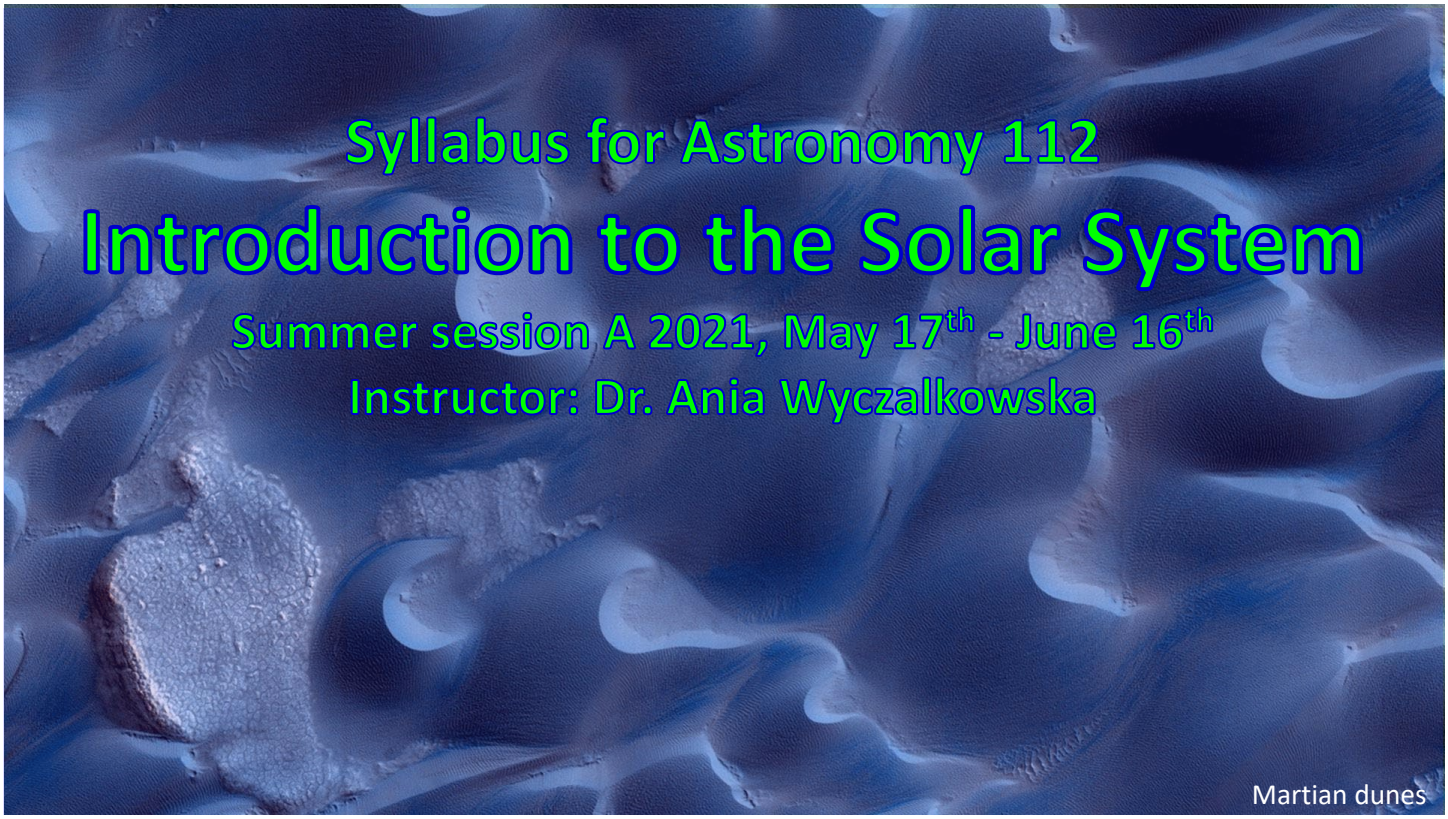

Instructor: **Ania Wyczalkowska**

office: 327 Planetary Hall (sorry, not there this summer ☹)
phone: × 34166 (sorry, not there this summer ☹)
e-mail: awyczalk@gmu.edu

By far the best way to contact me is by e-mail. However, I teach a lot (and have a life) so please keep in mind that my response may not be instantaneous. In particular, on some days I'm teaching for the better part of the day and may not get a chance to read your e-mails till late or till the next day. Since I also teach a number of other courses, **please make sure to include the course (ASTR 112) in your mail.**

I will be checking my e-mail as often as I can and try to get back with you as soon as I can. If the question does not involve anything personal, a better place for it is our discussion board: if you are unsure about something, your classmates may be too and this way they can get the information faster. Moreover, your Learning Assistant will be also able to see your post and respond.

office hours: I will be scheduling on-line sessions on Blackboard Collaborate. The exact time will be announced on Blackboard. If you cannot make the scheduled time and wish to speak with me, please mail me and we'll schedule an appointment. Office hours are not mandatory: your participation is welcomed, but not required. Office hours are for you: to ask me questions, get help, or discuss with me anything you want.

course website: Blackboard 9 The course is available on Blackboard with your GMU log-in name and password. Select PHYS 104 (a single site for both the lecture and the lab). This is where all course materials will be posted. It is your responsibility to check the website regularly for possible changes and important announcements.

Meeting times: As an asynchronous online course, we do not have a "fixed" meeting time. Lab exercises can be completed anytime before the due date which will typically, with the exception if the introductory unit "Twinkle, twinkle little star…" (see schedule at the end of this document) be set at 11:59 PM on Wednesdays and on Saturdays. Our first

week starts on Monday, May 17th the last lab will be due on June 16th. We need to do 10 experiments (including the observing activity) to meet GMU requirements, so we'll have to schedule two labs a week and do observing activity on top of that.

Nature of course delivery: The format of this online course is asynchronous and is structured around 10 learning units (labs) consisting of a variety of exercises. The course is delivered through Blackboard. Please be sure you have adequate technology to access the site and do the required work. Go to My Mason, sign in and select the Courses tab, then look for the Astronomy 112 course. If you need help there is a section of the courses page of My Mason called "Courses 9.1 Resources for Faculty and Students" with helpful links. Other sources of help with Blackboard:

- Contact courses@gmu.edu and include your Mason email and G#
- Contact the ITU Support Center at (703) 993-8870 for general help, including login or network issues

Course description: This is the laboratory that goes along with the introductory course Astronomy 111. The purpose of this course is to help students understand the process of science through astronomy investigations and the use of realistic simulations. An important learning goal is to help students understand and practice the rudiments of scientific reasoning as a model for investigations in other disciplines.

Blackboard login instructions: Access to My Mason and GMU email are required to participate successfully in this course. Please make sure to update your computer and prepare yourself to begin using the online format BEFORE the first day of class. Check the IT Support Center website. Navigate to the Student Support page for help and information about Blackboard. In the menu bar to the left you will find all the tools you need to become familiar with for this course. Take time to learn each. Make sure you run a system check a few days before class. Become familiar with the attributes of Blackboard and online learning.

Textbook: There are no required textbooks for this course. All materials will be found in the course on Blackboard. If you are currently enrolled in Astronomy 111 the assigned textbook will be useful for background information. In addition, the course has a link to the text, ***Astronomy***, a free, open education resource from OpenStax.

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

Technology requirements:

Hardware: You will need a reliable computer and internet access to view course materials on Blackboard and participate in lab sessions. You may also need to download programs, or use an application such as Flash to complete lab assignments. You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and access to a fast and reliable broadband internet connection (e.g., cable, DSL). A larger screen is recommended for better visibility of course material. You will need speakers or headphones to hear recorded content and a headset with a microphone is recommended for the best experience. A web cam will be valuable, though not absolutely required. For the amount of Hard Disk Space required taking a distance education course, consider and allow for:

- the storage amount needed to install any additional software and
- space to store work that you will do for the course.

If you consider the purchase of a new computer, please go to Patriot Tech to see recommendations.

Software: You will need a browser and operating system that are listed compatible or certified with the Blackboard version available on the myMason Portal. See supported browsers and operating systems. Log in to myMason to access this course. Labs may use Acrobat Reader, and Windows Media Player, QuickTime and/or Real Media Player.. Your computer should be capable of running current versions of those applications. Also, make sure your computer is protected from viruses, see some possibilities here: Mason IT suggested anitvirus software
Students owning Macs or Linux should be aware that some courses may use software that only runs on Windows. You can set up a Mac computer with Boot Camp or virtualization software so Windows will also run on it. Watch this video about using Windows on a Mac. Computers running Linux can also be configured with virtualization software or configured to dual boot with Windows.

Note: If you are using an employer-provided computer or corporate office for class attendance, please verify with your systems administrators that you will be able to install the necessary applications and that system or corporate firewalls do not block access to any sites or media types.

Course-specific Hardware/Software:

1) You will need to use **MS Office**, specifically Excel and Word, in this class. Office 365 version of MS Office should suffice and as a GMU student you get it free.
2) **NAAC native Apps labs:** is free software can be installed on your own computer and is necessary for several labs. Instructions for the download are on the website https://astro.unl.edu/downloads/
3) **Stellarium:** is free open source planetarium for your computer. It can be installed on your own computer and is necessary for one of the labs. There is also a web version available, but there is no tutorial for how to use it, so I recommend downloading it. You can download the version appropriate for your computer from: http://stellarium.org/
4) **Collaborate:** On-line office hours will be conducted using Collaborate Ultra, which you can access on Blackboard. To participate, you will need headphones and a mic. Instructions for using Collaborate are here: https://its.gmu.edu/knowledge-base/introduction-to-blackboard-collaborate-ultra/. You can get a full student guide from the site linked above including the instructions for troubleshooting audio and connections.

Other supplies:

- Notebook or paper for taking notes
- Pencils and/or pens
- Ruler or tape measure
- Digital camera (can be you phone camera)
- Other supplies will be listed in the manuals for specific labs.

Expected skills: All lab assignments require basic algebra and geometry skills. In addition, students should be familiar with word processing and spreadsheet programs, though tutorials are available in Office 365.

Lab procedures: You will be expected to prepare for each lab by reading/watching the posted introductory material. Reports, containing data, graphs and short writings, are due before the end of the assignment period. Due dates are listed in the schedule. Late submissions are not accepted and will count as a zero, unless extension is granted (and those only will be granted sparingly for a good reason and in advance – not at the last moment before the due date).

Group work: In the in-class lab students typically work in groups. This is not possible in an on-line course, but you are encouraged to communicate, discuss, and consult with your classmates. To facilitate that, we'll use Discussion Board and Collaborate. I have often found that, especially for technical questions, your classmates may be the best resources, since they may have encountered the same problems and know how to fix them, better than I do.

POLICIES:

Work Ethic: Distance education courses require more organization and self-discipline than do traditional courses. You are responsible for keeping up what is going on in the course, with any announcements and changes. Most importantly, you are responsible for keeping up with assignments. There is no time for makeups. Bottom line: you must do the learning - I can only assist and provide guidance and clarity. But you need to give me a chance and time.

Withdrawal: If you need to withdraw from this course you must do it within the University established time frame.

Students with Disabilities: Please contact The Office of Disability Services (SUB I, Room 222, Phone 703-993-2474) if you have a learning or physical disability that will require accommodation in the astronomy laboratory. You most obtain the proper paperwork and notify your instructor in advance to be accommodated.

Honor Code: You are expected to adhere to the George Mason University student honor code:

> "George Mason University shares in the tradition of an honor system that has existed in Virginia since 1842. The Honor Code is an integral part of university life. On the application for admission, students sign a statement agreeing to conform to and uphold the Honor Code. Therefore, students are responsible for understanding the provisions of the code. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. Therefore, cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. To maintain an academic community according to these standards, students and faculty must report all alleged violations of the Honor Code to the Honor Committee. Any student who has knowledge of, but does not report, an Honor Code violation may be accused of lying under the Honor Code."

The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. When in doubt (of any kind) please ask for guidance and clarification. Cut and paste from web sources is considered plagiarism, and submitting work of another student as your work is considered cheating. If you received help from a classmate, acknowledge it.

Classroom courtesy: It is important that students participate in all activities, contribute actively to groups and class discussions. Discussions should be conducted with respect for each other and at a high level of discourse. Disruptive behavior will not be tolerated and may result in a student being temporarily barred from participating in activities.

Student resources:

Academic Advising Center – 703-993-2470
Math Tutoring Center – 703-993-1460
Writing Center – 703-993-1200
Office of Disability Services – 703-993-2474
Campus Counseling Center – 703-993-2380

Computer support: Computer and/or Web support is not my responsibility.

LEARNING GOALS AND OBJECTIVES

Purpose: Astronomy 112 is part of the general education program at GMU. According to the GMU catalogue the purpose of general education courses is:

"…to educate, liberate, and broaden the mind, and to instill a lifelong love of learning. In conjunction with each student's major program of study and other electives, minors, or certificates, this program seeks to produce graduates with intellectual vision, creative abilities, and moral sensibility as well as skills to ensure a well-rounded and usable education. General Education courses will ensure that all undergraduates develop skills in information gathering, written and oral communication, and analytical and quantitative reasoning; expose students to the development of knowledge by emphasizing major domains of thought and methods of inquiry; enable students to attain a breadth of knowledge that supports their specializations and contributes to their education in personal and professional ways; and encourage students to make important connections across boundaries—for example, among disciplines, between the university and the external world, and between the United States and other countries."

Course overview: Astronomy 112 is a general education natural science course designed to familiarize you with the universe in which we live and with the principles of scientific inquiry that have enabled us to explore and understand that universe. We are part of the universe and thus can learn about our origins by studying it. The study of the universe is possible through evidence based scientific inquiry that anyone can understand.
Astronomy 112 has for its subject matter our solar system.

- Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding:
  - is not a body of facts but rather a process through which we seek to understand the world around us and so it continuously evolves based on new evidence
  - differs from personal and cultural beliefs
- 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. 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

Perhaps most importantly, in line with the general education goals, this class should stimulate your curiosity about the universe, and encourage you to continue to read and think about astronomy and other areas of science long after your college education is complete.

Grading: Each lab will be graded on the basis of the material I ask you to submit. Most labs have answer sheets that you will fill out and submit via blackboard. Most of the labs will have a required conclusion or discussion question as well. The total maximum point value for the lab write-up is 10 points.
Lab reports grades will be averaged and percentage of total points calculated to arrive at your grade. Percentages translate to letter grades according to the table below
There are no make-up labs, but I will drop the lowest score.

Letter Grade	Percentage
A+	97-100
A	93-96.9
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	75-79.9
C	70-74.9
C-	67-69.9
D	60-66.9
F	below 60

Class Schedule.

(subject to verification by real life)

Lab	Due date	Lab exercise
1	May 24h	Observing activity (weather permitting)
2	May 19th	Solar System Walk
3	May 22nd	Properties of solar system objects- hypothesis building
4	May 26th	Navigating the sky
5	May 29th	Kepler's laws of planetary motion
6	June 2nd	What sinks?
7	June 5th	Exploring Mars
8	June 9th	Atmospheres
9	June 12th	Discovering exoplanets
10	June 16th	Habitable zone