
ASTR 503

Fundamentals of Astronomy

Overview

A fast-paced review of fundamental topics and concepts in astronomy. This course is designed to ensure a basic, quantitative knowledge of fundamental topics in astronomy and astrophysics. These topics include orbital mechanics, properties of radiation, principles of stellar radiation and spectra, structure and dynamics of the Milky Way, properties of galaxies, and basic cosmology.

Goals

After taking this course the students should be able to have a good level of understanding of fundamental astronomy processes, in preparation for future graduate astronomy coursework.

Requirements

For graduate students, no requirement. The course is cross-listed with Astro 403 for undergraduates. For undergraduates, astronomy 401 is required, or demonstrated background in astronomy and problem solving, with consent of instructor.

Course notes

The lecture notes, slides, and videos will be posted on Canvas, students are encouraged to take their own hand-written notes to better follow the material. The notes will be complemented with slides, images, and videos when appropriate.

Textbooks

The lecture notes will be complemented by the textbook “Foundations of Astrophysics” by Ryden & Peterson.

Fall 2020

Tue/Thu 10:30–11:45am

Professor: Dr Wladimir Lyra

E-Mail: wlyra@nmsu.edu

Class/Office:

<https://nmsu.zoom.us/j/7631131283>

Office Hours: TBD.

Preferred communication method: email.

Materials

- Scientific calculation (or computer).
- NMSU Canvas will be used for lecture notes, assignments, and grades.



Grading

This course is divided in modules (see “Topics”, below); each module will have an associated homework assignment that involves conceptual, analytical, and computational exercises. Each assignment is worth 100 points; the final grade is $(\sum_{i=1,n} HW^i)/n$, where HW^i is an individual homework assignment and n the number of assignments. Re-dos of the homework will be allowed. Homework comprise 80% of the grade. Quizzes will be given regularly, comprising 20% of the final grade.

A note on collaboration: I strongly encourage you to work with other students on the problem sets. You will find it very helpful to discuss the course material with your classmates, reviewing the overall concepts together, or discussing in general terms how to approach tricky aspects of a derivation or coding exercise. However, anything that you submit for course credit with only your name on it must be your original work and reflect your own thinking. If your solutions draw any inspiration from your classmates or group work, then please note whom you worked with.

The final grade will range from 0 to 100, and then converted to letter format. I will determine the mapping from numerical to letter grades at the end of the semester.

Topics to be covered

This is a **PRELIMINARY** list of the topics that will be covered. The list is **DYNAMIC** and **WILL** be updated as the course goes, based on how in-depth we decide to go on some topics, as well as on the interest of the class.

Class #	Date	Topic		Reading (Ryden & Peterson)
1	08/20	Positional astronomy		Ch 1
2	08/25			
3	08/27	Distances and Brightness		Ch 13.1, 13.2, 13.3
4	09/01			
5	09/03	Kepler’s laws		Ch 2.3, 2.4, 2.5
6	09/08			
7	09/10	Celestial mechanics		Ch 3
8	09/15			
9	09/17			
10	09/22	Radiative Transfer		Ch 5
11	09/24			
12	09/29			
13	10/01			
14	10/06	Excitation / Ionization balance		Ch 5
15	10/08			
16	10/13	Stellar Physics	Atmospheres	Ch 14 and Ch 15
17	10/15			
18	10/20		Structure	
19	10/22			
20	10/27			
21	10/29		Evolution	
22	11/03			
23	11/05	Galaxies and Galactic Structure		Ch 19 and Ch 20
24	11/10			
25	11/12			
26	11/17			
27	11/19	Cosmology		Ch 23 and Ch 24
28	12/01			
29	12/03			

Office hours

The (zoom) office hours will be defined in the first weeks of class as everyone's schedules crystallize. A poll will be sent to find the time most suitable to everyone. If you cannot make it in the chosen time, contact me so we can find a time that fits both our schedules. If you are able to phrase/illustrate your doubt in a clear way in writing, you are welcome to do so instead of scheduling a meeting.

Student Responsibility

You are responsible, as the student, for all material presented in class and in assignments, and for any announcements made during class time (which may include changes to the schedule), whether you are present or absent. It is your responsibility to attend and keep up with the rhythm of the class. Changes to assignments may happen, in which case I will communicate the change via Canvas. It is the student's responsibility to check Canvas periodically for these updates.

Class attendance is essential for the understanding of the material. If you should decide to drop the class, you must do so before the deadline listed in the schedule of classes, or a grade will be assigned. Dropping the class is the student's responsibility, not the instructor's.

Due diligence is defined as a measure of prudence, activity, assiduity, effort, expediency, and/or disclosure, as is properly to be expected from, and ordinarily exercised by, a reasonable and prudent person under the particular circumstances. If you exercise due diligence with respect to your responsibilities in this course, you will find that I am very sympathetic and will work very hard to resolve any problems that come up to our mutual satisfaction.

What you can expect from me: I love astronomy. If you don't get excited about anything we study this semester I will consider it a failure on my part. I will do my best to be respectful of your time and effort. I will strive to make every reading, class session, and homework assignment as useful to your learning as possible. I will listen to and respectfully consider any comments or suggestions you have about any aspect of this course. I will be respectful of any protected status recognized by the university, as well as many that are not, assuming that you are duly diligent in alerting me to any possible issues before or as they arise. I will not tolerate harassment or bullying.

Use of Laptop Computers & Mobile Phones

You may use a laptop computer in the classroom only for class purposes. You may not surf the web, play games, or engage in any activity, which I would consider disruptive to you, or students around you. Smartphones and tablets must be silent and turned to airplane mode, and can only be used to participate in class.

Use of Listening, Video, or Other Recording Device

The use of any electronic listening, or recording devices by anyone in class are not permitted. If you need to use a recording device as an authorized disability accommodation, you must provide me with verification from the Student Accessibility Services (SAS) prior to the use. The SAS office is located at Corbett Center, Rm. 208 Phone: (575) 646-6840 E-mail: sas@nmsu.edu Website: <http://sas.nmsu.edu/>

Academic Misconduct

Academic and non-academic misconduct: The Student Code of Conduct defines academic misconduct, non-academic misconduct and the consequences or penalties for each. The Student Code of Conduct is available in the NMSU Student Handbook online:

<http://studenthandbook.nmsu.edu/>

Academic misconduct is explained here:

<http://studenthandbook.nmsu.edu/student-code-of-conduct/academic-misconduct/>

Discrimination and Disability Accommodation

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

Main Campus

Student Accessibility Services (SAS)
Corbett Center Student Union Room 208
Trudy Luken, Director
575-646-6840
sas@nmsu.edu

New Mexico State University, in compliance with applicable laws and in furtherance of its commitment to fostering an environment that welcomes and embraces diversity, does not discriminate on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex (including pregnancy), sexual orientation, spousal affiliation, or protected veteran status in its programs and activities, including employment, admissions, and educational programs and activities. Inquiries may be directed to the Laura Castille, Executive Director, Title IX and Section 504 Coordinator, Office of Institutional Equity, P.O. Box 30001, E. 1130 University Avenue, Las Cruces, NM 88003; 575.646.3635; 575-646-7802 (TTY); equity@nmsu.edu.

Title IX prohibits sex harassment, sexual assault, intimate partner violence, stalking and retaliation. For more information on discrimination or Title IX, or to file a complaint contact:

Laura Castille, Executive Director and Title IX Coordinator
Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue
Phone: (575) 646-3635 E-mail: equity@nmsu.edu
Website: <http://equity.nmsu.edu/>

Other NMSU Resources

NMSU Police Department:	(575) 646-3311	www.nmsupolice.com
NMSU Police Victim Services:	(575) 646-3424	
NMSU Counseling Center:	(575) 646-2731	
NMSU Dean of Students:	(575) 646-1722	

For Any On-campus Emergencies:	911	
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Special Accommodation

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Trudy Luken, Director
 Student Accessibility Services (SAS) - Corbett Center, Rm. 208
 Phone: (575) 646-6840 E-mail: sas@nmsu.edu
 Website: <http://sas.nmsu.edu/>

Discrimination

NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status. Furthermore, Title IX prohibits sex discrimination to include sexual misconduct: sexual violence (sexual assault, rape), sexual harassment and retaliation. For more information on discrimination issues, Title IX, Campus SaVE Act, NMSU Policy Chapter 3.25, NMSUs complaint process, or to file a complaint contact:

Laura Castille, Title IX Coordinator
 Agustin Diaz, Title IX Deputy Coordinator
 Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue
 Phone: (575) 646-3635
 E-mail: equity@nmsu.edu
 Website: <http://eeo.nmsu.edu/>

This syllabus may be subject to change