

**Course Section Number: PHYS.220**

**Title: University Astronomy**

**Professor Figer**

### **Course Summary and Objectives:**

This course is an introduction to the basic concepts of astronomy and astrophysics for scientists and engineers. Topics include the celestial sphere, celestial mechanics, methods of data acquisition, planetary systems, stars and stellar systems, cosmology, and life in the universe. (Prerequisites: PHYS-211 or PHYS-211A or PHYS-207 or PHYS-216 or (MECE-102 and MECE103 and MECE-205) or equivalent courses.)

### **Location/Time:**

Carlson (CAR)-1125, TuTh 12:30PM - 1:45PM. Under certain circumstances, I may have to alter course requirements, assignment deadlines, and grading procedures; and the university may have to alter the academic calendar.

### **Attendance**

Students are expected to attend each lecture. Absences, for whatever reason, do not relieve students of their responsibility for fulfilling normal requirements in any course. In particular, it is the student's responsibility to make individual arrangements in advance of missing class due to personal obligations such as religious holidays, job interviews, athletic contests, etc., in order that he or she may meet his or her obligations without penalty for missing class. (RIT Governance Policy D4.0, Section I.B) It is the student's responsibility to notify the faculty member in advance of the planned absence. With advance notice of the planned absence, it is the faculty member's responsibility to ensure that the student can fulfill all class assignments and expectations without penalty or bias.

### **Makeup exams**

Makeup exams can be scheduled within one week of the regularly scheduled exams by request.

### **Instructor Contact:**

You can reach me in several ways. You can email at [figer@cfp.rit.edu](mailto:figer@cfp.rit.edu). My office is ENG-3111, and office hours are Wednesdays and Fridays 11:00AM – 11:50AM and also by appointment via email or text. You can text at 5855984731 to make an appointment or ask questions.

### **Class expectations:**

Attend all lectures, unless excused beforehand. Read all material from the lectures and in the assigned reading in the textbook. Learn from errors on homework and midterm, as these questions may be repeated on the final.

## **Books:**

Course textbook is Astronomy: Foundations of Astrophysics, Ryden and Peterson, ISBN-13: 978-1108831956,

<https://www.amazon.com/Foundations-Astrophysics-Barbara-Ryden/dp/1108831958/>

<https://rit.textbookx.com/institutional/index.php?action=browse#books/3580373/>

## **Homework:**

Homework will generally be released on Mondays, are due the following Tuesday before class, and can be retrieved through MyCourses. Your answers should be uploaded to MyCourses. The homework file name should be in this format: HWN\_lastname.xxx, where N is the homework number, lastname is your last name, and xxx is the appropriate file extension. Homework must be typed or handwritten and then scanned.

The purpose of these assignments is to give you a chance to practice and absorb the material that you are learning during class. I encourage students to work together and discuss these assignments, but please hand in your own work. Answers to mathematical problems must detail every step of the calculation in order to receive full credit. Answers to essays and short-answer questions must be in proper English. I will take off points if I cannot understand what you are trying to say.

Work copied from internet sources will not be accepted. Start the assignments early and ask me if you have questions. I will not answer any questions sent after noon on Fridays through Mondays. Hand in the assignments on time. A penalty of one letter grade (10%) per day will be taken off of assignments handed in late. Homework handed in after the start of class time on the fourth day after it was due will be scored as zero.

## **Midterms:**

Midterms will be as long as a class period, in-class, and closed-book. Calculators are allowed, but it is not allowed to use stored equations in them. Questions on the exam will generally be similar to those in homework assignments. You will receive a page of constants and equations before the exams for use in studying, and that page will be included in front of the exam sheets. There will be a review session before each midterm.

## **Final Exam:**

The final exam will be 2.5 hours long, in-class, closed-book, and cumulative. Calculators are allowed, but it is not allowed to use stored equations in them. Questions on the exam will generally be similar to those in homework assignments and in the midterm exams. You will receive a page of constants and equations before the exam for use in studying, and that page will be included in front of the exam sheets. There will be a review session before the final exam.

## **Evaluation Criteria:**

Final grades will be an average of the following.

- homework 30%

- mid-term exams 30%
- final exam 40%

## **Disclaimer:**

Under certain circumstances, I may have to alter course requirements, assignment deadlines, and grading procedures; and the university may have to alter the academic calendar.

## **Email Policy**

I will respond to e-mails within 24 hours Monday through Friday. If you do not hear from me in that time frame, please resend your e-mail or text, as messages can get lost in my inbox. Over the weekend, do not expect a response until Monday after class. Your emails must be structured formally, addressed to me as Professor Figer, and signed with your name. Please include PHYS220 in the subject line.

## **Technology in the classroom**

Phones, tablets, and laptop computers are not to be used in class. These devices are distracting to the user as well as other students in the classroom, and there is ample evidence that students who regularly use these devices during class perform significantly lower than those who don't. Please turn off all sounds and vibrations on your phone. If for any reason you feel it is necessary to be able to use one of these devices during this class, please see me after class or during office hours.

## **Academic Integrity Statement**

As an institution of higher learning, RIT expects students to behave honestly and ethically at all times, especially when submitting work for evaluation in conjunction with any course or degree requirement. The School of Physics and Astronomy encourages all students to become familiar with the RIT Honor Code:

<http://www.rit.edu/studentaffairs/studentconduct/RITHonorCode1.htm> and with RIT's Academic Honesty Policy: [http://www.rit.edu/studentaffairs/studentconduct/rr\\_academicdishonesty.php](http://www.rit.edu/studentaffairs/studentconduct/rr_academicdishonesty.php)

“Any act of Academic Dishonesty will incur the following possible consequences. After notifying and presenting the student with evidence of such misconduct, the instructor has the full prerogative to assign an “F” for the offense, or to assign an “F” for the entire course. The instructor will inform and, if possible, meet with the student concerning the decision reached on the “F” for the offense, or the “F” for the entire course. A student may be brought before the Academic Conduct Committee of the College in which the alleged offense occurred, and may face academic suspension or dismissal from the Institute. (See D17.0, “Academic Conduct and Appeals Procedures,” and D18.0, “RIT Student Conduct Process.”)”

If you are caught cheating on any assignment or exam, appropriate academic disciplinary action will be taken to the fullest extent allowed by the University. Refer to your “Students Rights and Responsibilities” handbook for further guidance on the Academic Dishonesty policy at RIT.

## **Statement on Reasonable Accommodations**

RIT is committed to providing reasonable accommodations to students with disabilities. If you would like to request accommodations such as special seating or testing modifications due to a

disability, please contact the Disability Services Office. It is located in the Student Alumni Union, Room 1150; the Web site is [www.rit.edu/dso](http://www.rit.edu/dso). After you receive accommodation approval, it is imperative that you see me during office hours so that we can work out whatever arrangement is necessary.

## **Schedule**

<b>Week</b>	<b>Lec</b>	<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>HW Due</b>
1	1	17-Jan 19-Jan	Introduction	1	
	2		Scale of the Universe		
	3		Celestial Sphere		
2	4	24-Jan	Motion of the Sky	2.5, 2.6	1
	5	26-Jan	Wavelength Regions		
3	6	31-Jan	Telescopes	6	2
	7	2-Feb	Imaging		
4	8	7-Feb	Spectroscopy	5	3
	9	9-Feb	Emission Mechanisms		
5	10	14-Feb 16-Feb	Energy Sources	2.1-2.4, 3.1, 8, 10, 11, 15.2, 15.3	4
	11		The Solar System		
6	12	21-Feb	Solar System Formation	12.1, 12.2	5
		23-Feb	Midterm #1		
7	13	28-Feb	Exoplanets	12.3, 12.4, 7.1, 7.2	6
	14	2-Mar	The Sun		
8	15	7-Mar	Properties of Stars	13, 14	7
	16	9-Mar	Stellar Classification		
9			Spring Break		
10	17	21-Mar 23-Mar	Stellar Structure I, II, III	15	8
11	18, 19	28-Mar 30-Mar	Star Formation, Stellar Evolution	17.1, 17.2	9
			Midterm #2		
12	20	4-Apr	Star Clusters	18	10
	21	6-Apr	Stellar Remnants		
13	22	11-Apr 13-Apr	Black Holes and Variable Stars	17.3, 18.3, 18.4, 19.1-19.5, 16.1-.2	11
	23		The Galaxy		
	24		The Interstellar Medium		
14	25	18-Apr 20-Apr	The Galactic Center	19.6-19.7, 20.1, 20.5, 21.1, 21.2, 22.1	12
	26		Dark Matter		
	27		Galaxies		

15	28	25-Apr	Instruments and Detectors	6.4, 23, 24	13
	29	27-Apr	Cosmology and Fate of the Universe		
16		4-May	Final Exam 5/4/2023, Thursday 1:30PM - 4:00PM Car 1125		