

Fall 2018

# PHYS 320-001: Astronomy and Astrophysics I

Dale Gary

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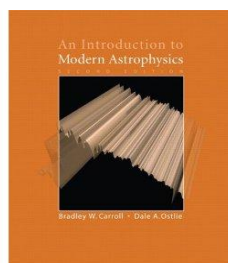
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# PHYSICS 320, ASTRONOMY AND ASTROPHYSICS I

## COURSE OUTLINE (Fall 2018)

*Text for the course*



### Introduction to Modern Astrophysics

(2nd Edition)  
by  
*Carroll & Ostlie*

**Time/Location:** 10:00–11:25 am T, R; 111 Cullimore  
**Instructor:** [Prof. Dale E. Gary](#)  
**Office:** 101 Tiernan; Office hours:  
 2:30 pm - 4 pm, Mon  
**Phone:** (973) 642-7878  
**E-Mail:** [dgary@njit.edu](mailto:dgary@njit.edu)  
**Web Page:** <http://web.njit.edu/~gary/320>

- **Readings:** The reading assignments are listed below. For this course, we will be covering Chapters 1, 2, 3, 6, 11, 12, 19, 20, 21, 22 and 23. Complete the readings **before** the corresponding lectures.
- **Homework:** The homework assignments will be collected on each Thursday.
- **Exams:** There will be two in-class exams during the semester, and the final exam.
- **Grades:** Your grade will be based on your homework (20%), in-class exams (30%), attendance and class participation (20%), and final exam (30%).
- **Observing Sessions:** Two *optional* observing sessions in the observatory on the roof of Faculty Hall will be held during the semester. If possible, we will plan a trip to the Dreyfuss Planetarium at the Newark Museum.

Here are the approximate weights to be used for calculating the final grade and the final grade scale:

30% for the two common exams (15% each)	85% and more	A
30% for the final exam	80% - 84%	B+
20% for the total homework grade	70% - 79%	B
20% for total attendance/class participation	65% - 69%	C+
	55% - 64%	C
	50% - 54%	D
	49% and less	F

Grades are not negotiable. A score of 84.99999% is a B+, not an A

Lecture Number and Title	Reading Assignment	Homework Assignment
<b>Lecture 1</b> (T 09/04). <a href="#">Introduction to the Solar System</a>	<a href="#">Earth as a Peppercorn</a> (web page)	Due 09/13: <a href="#">Homework given in lecture</a>
<b>Lecture 2</b> (R 09/06). <a href="#">Solar System From Earth: Positions in the Sky</a>	Chapt 1, Download and install the free program Stellarium ( <a href="#">Stellarium web page.</a> )	Due 09/13: Ch 1, Probs. 1.3, 1.4, 1.5 (but do this for Newark's latitude), 1.8
<b>Lecture 3</b> (T 09/11). <a href="#">Kepler's Laws</a>	Chapt 2, Section 2.1 ( <a href="#">Article from Physics Today</a> )	Due 09/20: Ch 2, Prob. 2.2, <a href="#">Mercury Problem</a>
<b>Lecture 4</b> (R 09/13). <a href="#">Newtonian Mechanics</a>	Ch 2, Section 2.2	Due 09/20: <a href="#">ISS and Jupiter Problems</a>
<b>Lecture 5</b> (T 09/18). <a href="#">Telescopes and Detectors</a>	Chapter 6, Section 6.1, 6.2	Due 09/27. Ch 6, Probs. 6.2, 6.9 ( <a href="#">PDF Pages</a> ) <a href="#">Solar Eclipse Problem</a>
<b>Lecture 6</b> (R 09/20). <a href="#">Star Distances and Magnitudes</a>	Chapter 3, Section 3.1, 3.2, 3.4, 3.6	Due 09/27. Ch 3, <a href="#">Lecture6_HW</a>
<b>Lecture 7</b> (T 09/25). <a href="#">Orbital Mechanics</a>	Ch. 2, Sections 2.2, 2.3. <a href="#">Sky Live 3D Solar System</a>	Due 10/04: Ch 2, Prob. 2.13, 2.14 (but for prob. 2.14, instead of Comet Halley, answer using the object <a href="#">2002 VE68</a> , whose period is 224.82 days and eccentricity is 0.41), <a href="#">Lecture07_HW</a> ,
<b>Lecture 8</b> (R 09/27). <a href="#">Interstellar Medium</a>	Chapter 12, Sections 12.1	Due 10/04: Ch. 12, Probs. 12.4, <a href="#">Lecture 8 problems</a>

<b>Lecture 9</b> (T 10/02). <a href="#">Protostar Formation</a>	Chapter 12, Section 12.2	Due 10/12: Ch. 12, Probs. 12.17, <a href="#">Lecture 9 problems</a>
(R 10/04). <i>Test on Mechanics and Orbits (Study Guide) Rm: 210 Kupfrian</i>	Chapters 1,2,3,6 <a href="#">Equation Sheet</a>	
<b>Lecture 10</b> (T 10/09). <a href="#">Search for Extrasolar Planets</a>	Chapter 7, Section 7.4, Chapter 23, Section 23.1	Due 10/19: Ch. 23, Probs. <a href="#">Lecture 10 problems</a>
<b>Lecture 11</b> (R 10/11). <a href="#">Formation of Planetary Systems</a>	Chapter 23, Section 23.2	Due 10/26: Ch. 23, Probs. 23.5, 23.9, <a href="#">Lecture 11 problem</a>
<b>Lecture 12</b> (T 10/16). <a href="#">Physical Processes of the Solar System: Tidal Effects</a>	Chapter 19, Sections 19.1-19.2	Due 10/26: Ch. 19, Probs. <a href="#">Lecture 12 problems</a>
<b>Lecture 13</b> (R 10/18). <a href="#">Physical Processes of the Solar System: Atmospheres</a>	Chapter 19, Sections 19.3	Due 11/02: Ch. 19, Probs. <a href="#">Lecture 13 problems</a>

<b>Lecture Number and Title</b>	<b>Reading Assignment</b>	<b>Homework Assignment</b>
<b>Lecture 14</b> (T 10/23) <a href="#">Mercury</a>	Chapter 20, Sections 20.1, 20.4 (see also 19.3)	Due 11/02: 20.2, 20.5, <a href="#">Lecture 14 problem</a>
<b>Lecture 15</b> (R 10/25). <a href="#">Venus, Earth, Moon</a>	Chapter 20, Sections 20.2-20.4	Due 11/09: 20.8, 20.9
<b>Lecture 15</b> (T 10/30). <a href="#">Venus, Earth, Moon</a>	Chapter 20, Sections 20.2-20.4	Due 11/09: 20.8, 20.9
(R 11/01) <i>Test on Formation of Planetary Systems (Study Guide) Rm: 210 Kupfrian</i>	Chapters 12, 19, 23	
<b>Lecture 16</b> (T 11/06). <a href="#">Mars</a> (check out this <a href="#">image of the day</a> )	Chapter 20, Section 20.5	Due 11/16: None
<b>Lecture 17</b> (R 11/08). <a href="#">Giant Planets</a>	Chapter 21, Sections 21.1, 21.3	Due 11/21: <a href="#">Lecture 17 problems</a>
<b>Lecture 18</b> (T 11/13). <a href="#">Saturn, Moons and Rings</a>	Chapter 21, Sections 21.2, 21.3	Due 11/21: None
<b>Lecture 19</b> (R 11/15). <a href="#">Moons and Rings of the Other Giant Planets</a>	Chapter 21, Section 21.2	Due 11/30: <a href="#">Lecture 19 problems</a>
<b>Lecture 20</b> (T 11/20). <a href="#">Pluto, Kuiper Belt</a> Also, presentation by Mohamed Miraoui on Pluto.	Chapter 22, Sections 22.1-22.2	Due 12/07: None
<b>Lecture 21</b> (T 11/27). <a href="#">Asteroids, Comets and Meteors ppt file Lecture html</a>	Chapter 22, Sections 22.3-22.4 <a href="#">Podcast (mp3 file)</a>	Due 12/07: 22.8, 22.10 <a href="#">Lecture 21 problem</a>
<b>Lecture 22</b> (R 11/29). <a href="#">The Sun</a>	Chapter 11, Sections 11.1-11.2	Due 12/12: <a href="#">Lecture 22 problems</a>
<b>Lecture 23</b> (T 12/04). <a href="#">Solar Activity</a>	Chapter 11, Section 11.3	Due 12/12: <a href="#">Lecture 23 problems</a>
<b>Lecture 24</b> (R 12/06). <a href="#">Interplanetary Space and the Heliosphere</a>	Chapter 11, Section 11.2	
<b>Lecture 25</b> (T 12/11). <a href="#">Life in the Solar System</a>	None	
<b>Lecture 26</b> (skip). Review ( <a href="#">Study Guide</a> )	None	

**12/21 Final Exam (Study Guide)**

**Chapters 1, 2, 3, 6, 11, 12, 19-23 (Rm 100 ECEC)**