

PHYSICS 320, ASTRONOMY AND ASTROPHYSICS I

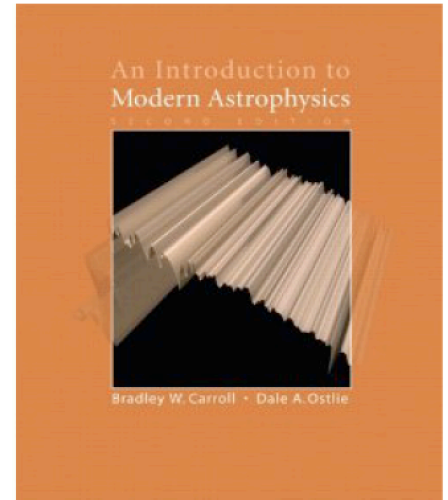
COURSE OUTLINE (Fall 2015)

Instructor: [Prof. Wenda Cao](#)
Office: 101 Tiernan, Phone: 973-596-5301
Email: cao@njit.edu
Office hours: MR 2:30 pm - 4:30 pm

Textbook: Introduction to Modern Astrophysics, 2nd Edition, by Carroll & Ostlie

Web Page: <http://web.njit.edu/~cao/320> where you will find weekly reading assignments, lecture notes, reviews, homework assignments and solutions etc.

Schedule: 1:00 – 2:25 pm Monday, Thursday @ FMH 110



Description: This course provides a quantitative introduction to the astronomy of the Sun, Earth and the solar system, with an emphasis on the physical principles involved. Students will study the motion, structure, atmosphere, energy, and magnetism of the Sun, planets, and satellites. The major themes include: the role of gravity in shaping the solar system, the energy balance of the planets, magnetism, and physics of light and colors. Importantly, students will learn to *reason* out of observational facts using basic physics knowledge. In this course, students will learn basic astronomical methods from lectures, and also be updated with new discoveries and emerging scientific topics with societal impact.

- **Readings:** The reading assignments are listed below. For this course, we will be covering Chapters 1, 2, 3, 5, 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 Monday.
 - **Project:** Students will conduct a group project to research “Life in the solar system and beyond”. The final presentation will be given in November.
 - **Exams:** There will be two in-class exams during the semester, and the final exam. The two in-class exams are tentatively scheduled on 10/1 (R) and 11/2 (M).
 - **Grades:** Your grade will be based on your homework (20%), in-class exams (30% = 15%*2), attendance and project (20%), and final exam (30%).
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COURSE SYLLABUS (tentative)

Topics

Dates

PART I: INTRODUCTION TO ASTRONOMY

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|-------------------------------------|---------|
| 1. Introduction to the Solar System | 09/03 R |
| 2. Astronomical Distance | 09/08 T |
| 3. Nature of Light I | 09/10 R |
| 4. Nature of Light II | 09/14 M |
| 5. Kepler's Laws | 09/17 R |
| 6. Newtonian Mechanics | 09/21 M |
| 7. Optics and Telescopes | 09/24 R |

PART II: PLANETS AND MOONS

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|--|---------|
| 1. Physical Processes in the Solar System | 09/28 R |
| 2. The Living Earth | 10/05 M |
| 3. The Moon and Eclipses | 10/08 R |
| 4. Terrestrial Planets - Mercury and Venus | 10/12 M |
| 5. Terrestrial Planets - Mars | 10/15 R |
| 6. Jovian Planets – Jupiter and Saturn | 10/19 M |
| 7. Pluto and Kuiper Belt | 10/22 R |
| 8. Asteroids, Comets and Meteors | 10/26 M |

PART III: OUR STAR: THE SUN

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|---------------------------------------|---------|
| 1. Standard Solar/Stellar Model | 11/09 M |
| 2. Solar Interior and Helioseismology | 11/12 R |
| 3. Solar Cycle | 11/16 M |
| 4. Solar Atmosphere | 11/19 R |
| 5. Solar Magnetism | 11/23 M |
| 6. The Active Sun | 11/30 M |
| 7. Space Weather | 12/03 R |

EXAMS AND PRESENTATIONS

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|--------------------------|---------|
| 1. CE1 Review | 09/28 M |
| 2. Common Exam I | 10/01 R |
| 3. CE2 Review | 10/29 R |
| 4. Common Exam 2 | 11/02 M |
| 5. Midterm Presentations | 11/05 R |
| 6. Final Review | 12/07 M |
| 7. Final Exam | 12/10 R |

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- **September 8, Tuesday will follow a Monday schedule.**
 - **November 26-29, Thanksgiving Recess**