New Jersey Institute of Technology

Physics 322-102: Observational Astronomy

COURSE OUTLINE – Spring 2016

TIME & LOCATION

Tuesday
6:00 p.m. – 9:05 p.m.
Tiernan 106

INSTRUCTOR

Dr. Slawomir Piatek
Office: Tiernan 423F
Phone: (973) 596-3551
Email: piatek@physics.rutgers.edu
Office hours: M. & Th. 5:00 p.m. – 6:00 p.m.

TEXTBOOK

To Measure the Sky. An Introduction to Observational Astronomy
Cambridge University Press
Author: Frederick R. Chromey
ISBN: 978-0-521-74768-4
Soft Cover
QUIZZES
Starting with the second week of classes, there will be a quiz at the end of each class.

EXAMS
There will be two exams: an in-class midterm exam on Tuesday, March 22 and a final exam on Monday, May 10, 6:00 PM – 8:30 PM. Both exams will be open-book format, and will consist of ten (10) short problems. Material from the text, lectures, and homework assignments will be used in selecting exam questions. The final exam will not be cumulative. Make-up exams will be offered for those with excused absences.

HOMEWORK
Starting with the third week of classes, homework assignment will be given consisting of three problems/questions from the text. The homework will be submitted on paper to me on the indicated due date. No late homework will be accepted.

GRADING
Your course grade will be determined by: midterm – 30%, final – 30%, quizzes – 20%, and homework – 20%. No extra-credit assignments will be offered. The course grade will be assigned based on the following grade matrix:

- 85% - 100% A
- 80% - 85% B+
- 70% - 80% B
- 65% - 70% C+
- 50% - 65% C
- 40% - 50% D
- 0% - 40% F

Learning Objective
- Become familiar with the various observable astronomical objects.
- Study the properties of light and the objects that emit or interact with light.
- Learn the basic statistics.
- Learn about the various coordinate systems employed in astronomy.
- Investigate laws of geometrical and wave optics.
• Become familiar with the various telescope designs.
• Study the fundamentals of solid state physics as applied to photonic detectors.
• Study CCDs.
• Understand the fundamental ideas in digital imaging.
• Learn the observational methods and analysis employed in photometry.
• Learn about spectrometers.
• Learn the observational methods and analysis employed in spectroscopy.

CLASS CALENDAR

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<th>WEEK</th>
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<th>TOPIC</th>
<th>READING</th>
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<td>1</td>
<td>1/19</td>
<td>• Contents of the Universe</td>
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<tr>
<td></td>
<td></td>
<td>• Light</td>
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<tr>
<td>2</td>
<td>1/26</td>
<td>• Light</td>
<td>1</td>
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<td>3</td>
<td>2/2</td>
<td>• Errors and uncertainty</td>
<td>2</td>
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<td>4</td>
<td>2/9</td>
<td>• Place, time, and motion</td>
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| 5    | 2/16   | • Place, time, and motion (cont’d)  
• Names, catalogs, and databases | 3 & 4   |
<p>| 6    | 2/23   | • Optics for astronomy       | 5       |
| 7    | 3/1    | • Optics for astronomy       | 5 &amp; 6   |
|      |        | • Astronomical telescopes    |         |
| 8    | 3/8    | • Matter and light           | 7       |</p>
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<th>Week</th>
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| 9    | 3/22   | • Detectors  
• Midterm                     | 8    |
| 10   | 3/29   | • Detectors                   | 8    |
| 11   | 4/5    | • Digital images from arrays  | 9    |
| 12   | 4/12   | • Photometry                  | 10   |
| 13   | 4/19   | • Photometry  
• Spectrometers                  | 10 & 11 |
| 14   | 4/26   | • Spectrometers and spectroscopy | 11   |