

Physics 234-002
Course Outline (Spring 2012)
FMH 408

W. & F. 8:30 AM - 9:55 AM

Dr. Slawomir Piatek

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Office Hour: T. 2:00 PM – 5:00 PM

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Special Notes:

Course Prerequisites: Phys 105&106, Phys 111 or Phys 111H and Math 111 (Calculus I), Phys 121 or 121H

Textbooks:

(A) Physics For Scientist and Engineers, by Serway and Jewett, Eight Edition, Publisher: Thompson Brooks/Cole. (ISBN 978-1-111-52428-9) [NJIT Special Edition - Phys 234] Chapters: 15, 16, 17, 18, 35, 37, 38

(B) Fundamentals of Physics, Ninth Edition, *Part 5* (ISBN 978-0-54795-3), by Halliday, Resnick and Walker, Publisher: CENGAGE. Chapters: 38, 39, 40, 41, 42, 44

Laboratory: The laboratory component of the course is Physics 231 A. This laboratory course may be optional for your major, confirm it with your department. If it is required for your major, it must be taken concurrently unless you have previously taken and passed Physics 231 A. **If you drop the course you must drop the laboratory – no exception.** The Physics 231A Laboratory Manual is required and the additional information concerning the purchase of the manual will be given in the first lab meeting

Honor Code Violations/Disruptive Behavior: NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. Any incidents will be immediately reported to the Dean of Student Services. In the cases the Honor Code violations are detected, the punishments range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT with notations on student's permanent record. Avoid situations where honorable behavior could be misinterpreted. No eating or drinking is allowed at the lectures, recitations and laboratories. Cellular phones must be **powered off** during the class hours (No standby mode!).

Exams: There will be two exams: mid-term and a final on the days indicated below. Each exam has 20 multiple-choice questions with five choices for an answer. To each exam you will be allowed to bring our textbook and a calculator.

Homework: I will assign homework on a regular basis starting January 26 (Thursday at 00:01 AM) using the web-based WebAssign system (<http://www.webassign.net/>) To use the system, you must purchase the access from either the NJIT bookstore or directly from the WebAssign web page. **Homework deadline is the following week Wednesday at 5:00 AM.** No late submission will be accepted. No paper. No partial credit.

The results and answers to the questions will be available on the WebAssign.

Your login name and password are your NJIT's eight-digit UCID. Please change the password and remember the new one. For institution type in: "njit" (lower case "n" and without the quotes). For example, the login name for Slawomir Piatek (UCID 23006789) would be 23006789 and the password 23006789.

Grading Policy:

I will determine your course grade based on the two exams and homework using the following weights:

Mid-term: 30%
Final: 30%
Homework: 40%

Your letter grade will be determined based on the following schedule:

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

Class Calendar:

Week 1

Oscillatory Motion

Read: Ch. 15(A) Sect.1 - 7

Suggested problems: Ch. 15(A) 1, 2, 5, 7, 13, 15, 17, 18, 26, 34, 37, 42

Week 2

Waves and superposition of waves.

Read: Ch. 16(A) Sect. 1 – 6; Ch. 17(A) Sect. 2 & 4; Ch. 18(A) Sect. 1 - 8

Suggested problems: Ch. 16(A): 5, 7, 17, 21, 25; Ch. 17(A): 36, 37; Ch. 18(A): 1, 2, 8, 16, 21, 33, 35, 38, 49

Week 3

The nature of light and the laws of geometric optics.

Read: Ch. 35(A), Sect. 1 - 8

Suggested problems: Ch. 35(A): 9, 11, 12, 18, 21, 34, 35, 36

Week 4

Wave Optics

Read: Ch. 37(A), Sect. 1 - 6

Suggested problems: Ch. 37(A): 1, 5, 7, 21, 29, 30, 35, 37

Week 5

Diffraction and polarization

Read: Ch. Ch. 38(A), Sect. 1 - 6

Suggested problems: Ch. 38(A): 1, 4, 13, 15, 17, 23, 29, 36, 40, 41

Week 6

Photons and Matter Waves

Read: Ch. 38(B), Sect. 1 - 9

Suggested problems: Ch. 38(B): 1, 2, 6, 15, 16, 17, 27, 28, 42, 43, 45, 57, 63, 66

Week 7

Photons and Matter Waves, cont'd. More about matter waves.

Read: Ch. 39(B), Sect. 1 - 9

Suggested problems: Ch. 39(B): 1, 2, 4, 14, 17, 19, 22, 32, 33, 38

Week 8

More about matter waves, cont'd.

[Midterm \(20 MC Qs; Open book, Chs. 15\(A\), 16 \(A\), 17.4\(A\), 18\(A\), 35\(A\), 37\(A\), 38\(A\); Bring a pencil, eraser, calculator, and a photo ID\)](#)

Week 9

The Bohr model of hydrogen atom and the Schrodinger's equation for hydrogen atom.

All about atoms.

Read: Ch. 39(B), Sect. 8 & 9. 40(B), Sect. 1 - 4

Suggested problems: Ch. 40(B): 1, 2, 3, 4, 7

Week 10

All about atoms, cont'd.

Read: Ch. 40(B), Sect. 5 - 12

Suggested problems: Ch. 40(B): 13, 14, 17, 27, 29, 33, 34, 48, 50, 52

Week 11

Conduction of electricity in solids

Read: Ch. 41(B), Sect. 1 - 5

Suggested problems: Ch. 41(B): 2, 3, 4, 8, 11, 12, 13, 18, 24, 26, 28

Week 12

Semiconductors, p-n junction, transistor. Nuclear Physics.

Read: Ch. 41(B), Sect. 6 – 11, Ch. 42(B), Sect. 1 - 6

Suggested problems: Ch. 41(B): 31, 32, 35, 36, 40 & Ch. 42(B): 1, 2, 4, 7, 10, 14, 17, 26, 28, 30, 31, 36, 48, 50, 53, 58

Week 13

Nuclear Physics, cont'd. Nuclear Energy.

Read: Ch. 43(B), Sect. 1 - 9

Suggested problems: Ch. 43(B) 1, 2, 3, 7, 9, 10, 30, 36, 37, 41

Week 14

Quarks, leptons, and the big bang. Review.

Read: Ch. 44(B), Sect. 1 - 15

Suggested problems: Ch. 44(B): 1, 2, 3, 11, 12, 24, 31, 32, 35, 39, 40, 43