

Spring 2015 Physics 121 Course Syllabus (ECE Sections)

Instructor:

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Office hours will be posted on instructor's schedules. Other times by appointment

Pre-requisites (all with grade of C or better):

- Physics 111 or 111H, and Math 111, 111H, or Math 132 (Calculus-I)

Co-requisites:

- Physics 121A (the lab course) and Math 112 (Calculus-II) or Math 133.

Physics 121A Laboratory must be taken along with Physics 121 unless you passed it previously. **If you drop Physics 121 you automatically drop the lab (and vice versa, no exceptions).** The Lab is otherwise a totally separate course from Physics 121 in that the lab instructors set the requirements and grades. The lab manual (Physics 121A Laboratory Manual 6th Edition) should be purchased at the bookstore. The most up-to-date lab schedule is posted at web.njit.edu/~smm8166.

Materials for Physics 121:

- **Textbook (Abbreviation: Y&F): "University Physics", 13th Edition**, authors **Young & Freedman** (Pearson 2012). We use Chapters 21 to 31, which are published as bound, 3 hole binder, and E-text versions.
- **Mastering Physics Online Homework System:** Each student must obtain an access code kit that allows use of the online homework system. In addition to using the access code, each student must enroll in the Mastering Physics course for his/her Physics 121 section using a course identifier code supplied by the instructor.
- Homework assignments and tutorials posted on-line in Mastering Physics will be automatically graded. Specific information will be available directly from all the instructors, and/or their web sites.
- The NJIT bookstore will stock Volume 2 text bundles (chaps 21-37 bound with the access code and E-text kit - **ISBN = 0321928814 or 9780321928818**). Any other version of the text containing Chapters 21 – 31 is OK. Any access code kit bought separately must be for the right text, specified above, so check before you buy.
- **"iClickers" will NOT be used. There will be weekly in-class quizzes**
- **Web Sites:** Instructors may post lecture notes, problems, grades, etc. on their web sites. So check there often.

Learning Outcomes: This course is the second of the calculus-based introductory Physics series.

- You can expect to be assessed on learning outcomes by means of 3 common exams, a final exam, in-class quizzes, scores on homework assignments, and a small class participation component.
- The principal learning outcome is to demonstrate understanding and mastery of classical electricity and magnetism up to AC circuits, not including Maxwell's Equations or beyond. The subject matter areas you will be assessed on include electric charge, electric and magnetic fields, forces on stationary and moving charges and currents due to electrostatic and magnetic fields, electrostatic potential and potential energy, Gauss' Law, capacitance, current, resistance, DC circuits, the Biot-Savart Law, Ampere's Law, Faraday's Law, inductance, RC circuits, LR circuits, LCR circuits, AC circuits including Phasor diagrams and resonant oscillations.
- In any/all of the above subject areas, you should be able to:
 - recall and use the conceptual and mathematical definitions and be able to explain them.
 - explain the conceptual and mathematical relationships between quantities used.
 - use symmetry arguments, sketches and diagrams, graphs, field maps, algebra, trigonometry, and basic integral and differential calculus methods in interpreting material using reasoned arguments and also in interpreting and setting up textbook-level problems.
 - explain and manipulate equations and techniques developed in the text, lectures, problem examples, and in the course of working problems.
 - apply the skills above to successfully solve textbook-level problems with numeric, symbolic, or conceptual answers.

The Schedule on Page 4 lists the topics covered, and text readings. Do the homework problems: it is almost impossible to succeed in physics courses without working a lot of problems. The second to last column provides additional recommended problems to be covered in the recitation. Please work them out before the recitation.

- Read the assigned sections of the text before the lecture covering that material.
- Submit the weekly homework assignments before they are due.
- **Students who do not submit homework are automatically lowering their average by 12 %.**
- The in-class quiz solutions will be posted each week

Specific information for the Mastering Physics homework system: You will have to create an account on the MP system if you do not have one already. You may not be able to sign up for the course your instructor is using until you have a valid Mastering Physics access code. So acquire one early and contact your instructor if this is a problem. Your instructor will announce a Mastering Physics course identifier (**MPTYSON44037**) for you to use when enrolling in your specific class. Use your NJIT email address as the logon ID for your account..

- The Mastering Physics login is **<http://www.masteringphysics.com>**. Click on "Student" in the upper left of the box. Respond "yes" that you have an access code (create an account if you do not already have one). Input your name exactly as it appears on NJIT's records: last name first, followed by a comma and your first and possibly middle name. Likewise, enter your 9 digit NJIT ID where indicated. For your own reference, record the unique course number announced by your instructor, and your Login ID and Password.
- Instructors cannot access forgotten logins or passwords.

TOPIC	TEXT STUDIES	RECOMMENDED PRACTICE PROBLEMS
Week 1 Vectors, Intro to Fields Electric Charge and Force	Chap. 21.1-21.3	1.32, 1.43, 1.46, 1.91, 1.97 21.7, 21.13, 21.19, 21.92
Week 2 Electric Fields	Chap. 21.4-21.7	21.26, 21.31, 21.33, 21.45, 21.54, 21.58, 21.61, 21.95
Week 3 Gauss' Law	Chap. 22.1-22.5	22.4, 22.7, 22.11, 22.15, 22.17, 22.26, 22.35, 22.39, 22.43
Week 4 Electric Potential	Chap. 23.1-23.5	23.2, 23.11, 23.16, 23.24, 23.32, 23.39, 23.41, 23.64
Week 5 Capacitance	Chap. 24.1-24.6	24.5, 24.9, 24.14, 24.18, 24.22, 24.26, 24.30, 24.38, 24.42
Common Exam I Monday, Feb. 23, 4:15 to 5:45		Chapters 21 to 23
Week 6 Current, Resistance, DC Circuits, Intro to Kirchoff;s Rules	Chat. 25.1-25.5 Chap. 26.1-26.2	25.2, 25.9, 25.13, 25.17, 25.30, 25.37, 25.41, 25.47, 26.2, 26.9, 26.11
Week 7 Multi-Loop and RC Circuits	Chap. 26.2-26.5	26.20, 26.24, 26.25, 26.27, 26.31, 26.36, 26.42, 26.53, 26.63, 26.91
Week 8 Charges and Currents in Magnetic Fields	Chap. 27.1-27.8	27.3, 27.6, 27.11, 27.15, 27.17, 27.23, 27.31, 27.37, 27.41, 27.53, 27.63
March 15 to March 22 Spring Recess		
Common Exam II Monday, March 23, 4:15 to 5:45		Chapters 24 to 26
Week 9 Sources of Magnetic Fields, Biot- Savart Law, Ampere's Law	Chap. 28.1-28.7	28.1 28.4, 28.11, 28.15, 28.18, 28.27, 28.31, 28.37, 28.43, 28.46
Week 10 Faraday's Law of Induction	Chap. 29.1-24.5	29.1, 29.6, 29.9, 29.15, 29.18, 29.21, 29.29, 29.33, 29.36, 29.38
Week 11 Inductance and RL Circuits	Chap. 30.1-30.4	30.2 30.6, 30.9, 30.15, 30.18, 30.21, 30.22, 30.24, 30.27
Week 12 LC and LCR Circuits, EM Oscillations, AC Circuits	Chap. 30.5-30.6 Chap. 31.1-31.2	30.31, 30.34, 30.36, 30.38 31.1, 31.4, 31.8, 31.13, 31.14
Common Exam III Monday, April 20, 4:15 to 5:45		Chapters 27 to 31
Week 13 AC Circuits, Resonance	Chap. 31.3-31.6 part 1	31.18, 31.23, 31.25, 31.27, 31.33, 31.35
Week 14 More AC Circuits	Chap. 31.3-31.6 part 2	31.37, 31.40, 31.45, 31.49, 31.51, 31.52, 31.57