

Fall 2020

PHYS 121-007: Physics II

Esmeralda Vataj

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Physics 121 (Section 007) Course Syllabus – Fall 2020

Time: Fridays 12:30 pm- 01:50 pm

Room: 303 Central King Building (or virtual)

and Saturdays 09:00 am – 10:20 am

Room: Student Center ATRIUM (or virtual)

Delivery Mode: Converged Learning (NJIT Definition: Delivery of instruction is independent of place, merging the physical and virtual classrooms. There is an attendance expectation and students can choose to attend class face-to-face or using real-time synchronous video conferencing technology. Some instructors may require occasional proctored exams.)

Instructor Information

Dr. Esmeralda Vataj

Office: 454 Tiernan Hall

Office Hour: Wednesdays 12:30 pm-02:30pm (in person or virtual), other times by appointment

E-Mail: ev96@njit.edu

Mastering Physics Course ID: vataj35206

General Information

- Description: Physics 121 is a calculus-based introduction to electricity and magnetism, emphasizing fundamental concepts and applications. It is the second course in a three-course sequence.
- Pre-requisites (all with grade of C or better): Physics 111 or 111H, and Math 111 or 111H.
- Co-requisites: Physics 121A (the lab course) and Math 112 (Calculus-II).

Because of the COVID19 issues, the Department will allow students to take the various PHYS lectures without the lab, thus allowing one to do the lab in a later semester and face-to-face.

Thus, students may be in 200-level classes [online] and not taking the lab!

Learning Expectations, Goals, Outcomes

Students will be expected to demonstrate understanding and mastery of calculus-based classical electricity and magnetism up to AC circuits, not including Maxwell's Equations or beyond. The topics covered 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, students should be able to do the following:

- Recall and use the conceptual and mathematical definitions and be able to explain them.
- Understand the conceptual and mathematical relationships between quantities used.
- Explain and manipulate equations and techniques developed in the text, lectures, problem examples, and in the course of working problems.
- Use symmetry arguments, sketches and diagrams, graphs, algebra, trigonometry, and basic integral and differential calculus methods for reasoning about nature and in setting up and solving textbook-level problems.

- Critically evaluate the soundness and precision of their own reasoning and answers, explain and interpret their solutions to problems in a way that shows understanding, and identify and appraise the range of applicability of their results, and state the limitations of their solutions.
- Apply the skills above to successfully solve textbook-level problems with numeric, symbolic, or conceptual answers.

Learning outcomes are assessed by means of 3 common exams, a final exam, scores on homework assignments, in-class quizzes, and class participation scores.

Materials for Physics 121

- Textbook (Abbreviation: Y&F): “University Physics”, 15th Edition, authors Young & Freedman (Pearson, 2020). We use Chapters 21 to 31 in Volume 2. Most students now buy the e-text, which is bundled with the Modified Mastering Physics homework system. The ISBN is 978-0135159552. Students may also use the old 13th and 14th editions of the same text for reading assignments, as the sections numbers match. The end-of-chapter problems are numbered differently. Many students are comfortable using only the e-text.
- Mastering Physics Online Homework System: Each student must obtain an access code kit that allows access to the online homework system specifically for the 15th edition of “University Physics”. In addition to having a valid access code, each student must enroll in the Mastering Physics (MP) “course” for his/her Physics 121 section using a course identifier code supplied by each instructor. Homework assignments will be posted on-line in Mastering Physics and will be automatically graded. Specific information will be available directly from all the instructors, and/or their web sites. The access code kit must be for the 15th edition specifically.
- The newer “Modified Mastering Physics” platform that we are now using for the first time is reached for login using the following new url: <https://www.pearsonmylabandmastering.com/northamerica/>. We are no longer using the url from past semesters. The assignments have the same look and feel.
- NJIT Canvas System: lecture notes, problems, grades, etc. are posted on Canvas (PHYS 121007). So check there often.

Grading

Final Letter Grades will be based on a **term average** for the semester’s work that includes the three common exam scores, the final exam, the term’s homework score, in-class quiz scores, and participation measures for attendance. Here are the approximate weights to be used for calculating term averages:

- **48%** for all three common exams (16% each)
- **32%** for the final exam
- **20%** for the total of homework plus short in-class quizzes plus participation measures, with the 20% value distributed at each instructors’ discretion and announced during the first week of class. Provisionally, the homework assignments weigh 10% and class participation (in-class quizzes and clickers) 10%. Both traditional paper-based and clicker-style quizzes will be given and counted toward your grades (10%). Quizzes will be given to briefly review what was covered in the previous classes. In most cases, a couple of conceptual questions will be asked.
- The conversion of term average values to letter grades will use the following cutoff values: **85% for A, 75% for B+, 65% for B, 56% for C+, 50% for C, and D or F below 50%.**

Examinations

There will be three Common Exams plus a comprehensive Final Exam. The schedule is:

- Common Exam 1: Monday, October 12, 4:15 – 5:45 PM
- Common Exam 2: Monday, November 9, 4:15 – 5:45 PM
- Common Exam 3: Monday, November 30, 4:15 – 5:45 PM
- Comprehensive Final Exam after December 14, 2.5 hours long

The final exam will emphasize the work covered after common exam 3, but also re-caps the whole course. In-class quizzes covering preceding or current work may be given during lectures and/or recitations, and the grades may count toward your final course grade. There will be no make-up common/final exams.

The exams will be administrated virtually: no face-to-face exam session. You can choose your preferred place to take the exams - most likely your home. Brief oral test sessions following the regular exams may be given to mitigate any negative impacts incurred by the new mode of delivery due to COVID-19.

Missed Exams

Students who miss a common exam will receive a score of zero for that exam unless they present a valid excuse within 7 days of the exam. Students expecting to be absent from a common exam should discuss their situation with their instructor PRIOR TO their absence. Students who miss two or more common exams automatically fail the course unless they have acceptable excuses. In order to qualify for a (rare) "make-up" common exam a student needs to document the reason for not being able to take the test as scheduled (due for example to an exam conflict or documented illness). NJIT policy requires the documentation to be presented to a student's Physics 121 instructor AND to the Dean of Students, both of whom must agree to permit a "make-up" exam. Conflict common exams are usually held from 6:00 to 7:30 PM on exam days; contact Ms. Oertel (christine.a.oertel@njit.edu) for arrangements.

Course Policies

Honor Code Violations or Disruptive Behavior: NJIT has a zero-tolerance policy for cheating of any kind and for disruptive student behavior. Violations will be reported to and judged by the Dean of Students. The penalties range from failure in the course plus disciplinary probation up to expulsion from NJIT. Avoid situations where your own behavior could be misinterpreted as dishonorable.

- Students are required to agree to the NJIT Honor Code on each exam.
- Turn off all phones, wireless devices, laptops, and messaging devices of all kinds during classes and exams.
- Please do not eat, drink, or create noise in class that interferes with the work of other students or instructors.
- Needless to say, do not contact any "tutoring services" for help during or preceding an exam.

Attendance will be taken at all classes and exams. More than 3 unexcused absences (in total) is excessive. If you have excusable absences contact your instructor or the Dean of Students (973.596.3466, Room 255 Campus Center). Students may sign in only for themselves on attendance sheets; do not sign in for absent students.

Withdrawal: If you must withdraw from the course, do it officially through the Registrar before the last withdrawal date. If you simply stop attending and taking exams your instructor will have to assign a failing grade in the course.

Course Work

The Class Schedule (see below) lists the topics covered, text readings, and homework assignments, exam dates, etc. week by week throughout the term. Some details may be subject to change depending on the class schedule. Be sure to do the homework problems: it is almost impossible to succeed in physics courses without working a lot of problems. It will not help to use someone else's solutions. It can help to form study groups so long as each group member participates in real discussion and independent thought.

Each weekly work unit starts with a lecture and includes a related homework assignment. Some of the homework problems will usually be covered in recitation class and the final HW submit deadline is typically about a week after material is introduced in lecture class.

- Read the assigned sections of the text before the lecture covering that material.
- Read the instructor's lecture notes before class (if provided) and bring them to class.
- Work on homework problems before they are covered in recitation and certainly before they are due.
- The Mastering Physics online system shows the applicable homework due dates and keeps track of scores.
- Students will receive 5% reduction per day in homework score for late submission

Class Participation: Students are expected to initiate and participate in class discussions by asking and answering questions, doing quizzes, working actively with others during in-class group assignments. When students participate in an active learning environment they become more engaged, learn more, enjoy the course more, and have better success in the course.

Specific Information for the Mastering Physics (MP) homework system:

- You need a valid Mastering Physics account and access code to sign up for the course your instructor sets up on MP. Your instructor will announce the course identifier for you to use when enrolling in your specific class. Use your NJIT email address as the logon ID for your account. 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 identifier announced by your instructor, and your login ID and password. Instructors cannot access forgotten logins or passwords.

Help: If you are having trouble in this course visit or email your instructor; do not simply hope for a miracle and fall further behind. All instructors hold office hours (see above) and will also meet with students at other mutually convenient times.

Tutoring: Due to the ongoing progression of the COVID-19 (Coronavirus) pandemic, the Physics Tutoring Center will offer Physics tutoring remotely via WebEx. Tutoring will begin on Tuesday, September 8, 2020 and end Thursday, December 10, 2020. Tutoring schedule will be posted at: <https://physics.njit.edu/physics-tutoring-sign-sheet>

Academic Support and Students Affairs, Academic Advising Centers: These organizations assist students who need to make academic decisions, sometimes needing support to progress toward successful graduation.

Special Instructions

Refer to COVID-19 Code of Student Conduct Rules and Regulation (sent by email).

Physics 121 (Section 007) Class Schedule for Fall 2020

Date	Lecture Topics and Classes	Text (Y&F) Readings	Recitations & Assignments
Sep 4 Sep 5	Lecture 01: Vectors, Intro to Fields Lecture 02: Electric Charge & Force	Instructor Notes Sec. 21.1 – 3	Use some recitation periods for Lecture 01 & Lecture 02 Begin HW01, HW02
Sep 11 Sep 12	Lecture 03: Electric Field	Sec. 21.4 – 7	Recitations: HW01/02 Begin HW03
Sep 18 Sep 19	Lecture 04: Gauss' Law	Sec. 22.1 – 5	Recitations: HW03 Begin HW04
Sep 25 Sep 26	Lecture 05: Electric Potential	Sec. 23.1 – 5	Recitations: HW04 Begin HW05
Oct 2 Oct 3	Lecture 06: Capacitance	Sec. 24.1 – 6	Recitations: HW05 Begin HW06
Oct 9 Oct 10	Lecture 07: Current, Resistance, DC Circuits, Intro to Kirchhoff's Rules	Sec. 25.1 - 5, Sec. 26.1 – 2	Recitations: HW06 Begin HW07
Oct 12	Common Exam 1: October 12 Monday, 04:15 – 5:45 P. M.		Covers Lectures + HWs 01, 02, 03, 04 Vectors & Fields + Ch. 21 + Ch 22
Oct 16 Oct 17	Lecture 08: Multi-loop and RC Circuits	Sec. 26.2 – 5	Recitations: HW07 Begin HW08
Oct 23 Oct 24	Lecture 09: Charges & Currents in Magnetic Fields	Sec. 27.1 – 8	Recitations: HW08. Review Sessions Begin HW09
Oct 30 Oct 31	Lecture 10: Sources of Magnetic Field. The Biot-Savart Law, Amperes Law	Sec. 28.1- 7	Recitations: HW09 Begin HW10
Nov 6 Nov 7	Lecture 11: Faraday's Law of Induction	Sec. 29.1 – 5	Recitations: HW10 Begin HW11
Nov 9	Common Exam 2: November 9 Monday, 04:15 – 5:45 P. M.		Covers Lectures + HWs 05, 06, 07 Chapters 23, 24, 25, & 26.1
Nov 13 Nov 14	Lecture 12: Inductance, RL Circuits	Sec. 30.1 – 4	Recitations: HW11 Begin HW12
Nov 20 Nov 21	Lecture 13: LC & LCR Circuits, EM Oscillations, AC Circuits	Sec. 30.5 - 6 Sec. 31.1 – 2	Recitations: HW 12 Begin HW13
	Wednesday, November 25		Follow Friday Schedule
	Thursday November 26 to		Thanksgiving Holiday

	November 27		
Nov 28	Lecture 14: AC Circuits, Resonance	Sec. 31.3 - 6	Recitations: HW 13 ,14 Begin HW14
Nov 30	Common Exam 3: November 30 Monday, 04:15 – 5:45 P. M.		Covers Lectures & HW 08, 09, 10 Chapters 26.2-5, 27, 28
Dec 4 Dec 5 (Dec 11)	Review for final exam		
Dec 11		Last day of classes	
	Reading Days: Fri/Mon December 11/14	No classes	Review Sessions
	Final Exams: December 15 through 21		Comprehensive final exam: Chapters 21 - 31