

Spring 2021

PHYS 121-014: Physics II

George Georgiou

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Physics 121 Course Syllabus - Spring 2021

Prof. George Georgiou

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Office Hours: By appointment via webex

Canvas: canvas.njit.edu – **Syllabus, Lecture Notes and In-Class Quiz**

Phys 121 Lecture & Recitation using WEBEX

<https://njit.webex.com/meet/georgiou>

Section 014 – TF 12:30 – 1:50

Section 018 – TF 2:30 – 3:50

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. The topics covered are listed below.

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

- **Physics111 or111H, and Math111 or 111H, or Math 132 (Calculus-I).**

Co-requisites:

Math 112 (Calculus-II).

Physics 121A Laboratory must be eventually taken.

Physics 121A is a totally separate course from Physics 121. The lab instructors set the requirements and grades.

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 BiotSavart 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, field maps, 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 your own answers, explain and interpret your solutions to problems in a way that shows understanding, and identify and appraise the range of applicability of your results, and their limitations.
- 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 small class participation scores.

Textbook (Abbreviation: Y&F):

“University Physics”, 15th edition, Young & Freedman (Pearson).

This is the same textbook as used for Physics 111 We use Chapters 21 to 31. .

Alternatively, you can read any textbook covering calculus-based electromagnetics.

Each student must obtain an access code kit for Mastering Physics that permits use of the online homework system. Each student must enroll in the Mastering Physics (MP) course for his/her Physics 121 section (more later) using a course identifier code to be supplied by each instructor.

Any access code kit must be for the right text, specified above, so check before you buy. Also be careful where you buy the access code. Sites like Amazon sometimes sell expired codes. Codes can be safely bought at masteringphysics.com

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.

Email will be sent if there are significant differences between what we do in class and what is in the base notes. Email will also be the preferred communications method

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 measures of participation related to clicker use and attendance. Here are the approximate weights to be used for calculating term averages:

25% for the Midterm	April 5	Ch. 21-26
35% for the final exam	May 7-13	Comprehensive, ~ ½ Ch.27-31
20% for the homework on MasteringPhysics		
20% for the in-class quiz		

The conversion of term average values to letter grades will use the following cutoff values:

- A >85%, B+ 75-85%, B 65-75% for B, C+ 56-65%, C 50-56%, D 45-50%, F <45%.**

Examinations: The MIDTERM (35%) -- April 5 covering Ch. 21-26.

The FINAL (35%) will be comprehensive. About 1/2 of the problems will cover Ch. 27-31.

The date of the final exam is to be determined during finals week.

Missed Exams: Students who miss a common exam will receive a score of zero for that exam unless they discuss with the instructor, a valid excuse within 7 days of the exam.

HOMEWORK (20%):

Register on masteringphysics.com

MPGEORGIOU121014s21 for section 14 georgiou61322

MPGEORGIOU121018s21 for section 18 georgiou26474

In-Class-= Quiz (20%)

Attendance will be taken periodically using the in-class quiz. It will be sent by email to class, be **~10-15min** long and consist of **1-2 workout problems**. The in-class covers material from the previous week.

More than 3 unexcused absences (in total) is excessive.

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 course grade of "F".

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.

Course Work

The Class Schedule (page 4) lists the topics covered, text readings, and homework assignments, exam dates, etc. week by week throughout the term. Be sure to do the homework problems and more. It is impossible to succeed in physics courses without working a lot of problems. It will not help to use someone else's solutions, although it sometimes helps to form study groups so long as there is real discussion and independent thought.

Each work unit begins with a lecture and includes a related homework assignment and perhaps some (optional) tutorials. The homework problems are usually covered in recitation class and the latest submit date is 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.

Base Lecture notes are available on CANVAS.

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.

Students who do not submit homework are automatically lowering their term average.

Class Participation: Students are expected to participate regularly in class discussions by asking and answering questions. When students participate in an active learning environment engagement increases, as does understanding of the material and success in the course.

Specific Information for Mastering Physics (MP) homework system:

You will have to create an account on the MP system if you do not have one already. You can not sign up for the course your instructor sets up on MP 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 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.

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 have office hours and will meet with students at other mutually convenient times.

Tutoring:

The Physics Dept provides tutoring. (schedule to be sent by email when available). More information will be available from your instructor after the term starts. The instructor is also available for extra help. Send e-mail. Don't wait to seek tutoring as needed.

Lecture Topics and Classes	Text (Y&F) Readings	Recitations & Assignments** (exact due dates to be announced)
Monday, January 18	No Class	Martin Luther King
Week 01 (January 19) Lecture 01: Vectors, Intro to Fields	Instr. Notes	Begin HW01
Week 02 (January 26) Lecture 02: Electric Charge & Force	Sec. 21.1 – 3	Begin HW02
Week 03 (February 2) Lecture 03: Electric Field	Sec. 21.4 – 7	Begin HW03
Week 04 (February 9) Lecture 04: Gauss' Law	Sec. 22.1 – 5	Begin HW04
Week 05 (February 16) Lecture 05: Electric Potential	Sec. 23.1 – 5	Begin HW07
Week 06 (February 23) Lecture 06: Capacitance	Sec. 24.1– 6	Begin HW06
Week 07 (March 2) Lecture 07: Current, Resistance, DC Circuits, Intro to Kirchoff's Rules	Sec. 25.1 - 5, Sec. 26.1 – 2	Begin HW07
Week 08 (March 9) Lecture 08: Multi-loop and RC Circuits	Sec. 26.2 – 5 +REVIEW	Begin HW08
Spring Recess – March 14-21	NO CLASS	
Week 09 (March 23) Lecture 09: Charges & Currents in Magnetic Fields	Sec. 27.1 – 8	Begin HW09
Week 10 (March 30) Lecture 10: Sources of Magnetic Field. The Biot-Savart Law, Amperes Law	Sec. 28.1- 7	Begin HW10
MIDTERM – April 5	Ch 21-26	
Week 11 (April 6) Lecture 11: Faraday's Law of Induction	Sec. 29.1 – 5	Begin HW11
Week 12 (April 13) Lecture 12: Inductance, RL Circuits	Sec. 30.1 – 4	Begin HW12
Week 13 (April 20) Lecture 13: LC & LCR Circuits, EM Oscillations, AC Circuits	Sec. 30.5 - 6 Sec. 31.1 – 2	Begin HW13
Week 14 (April 27) Lecture 14: AC Circuits, Resonance	Sec. 31.3 - 6	Begin HW14
REVIEW – May 4 -- FRIDAY schedule	Review	
Reading Days – May 5,6	No classes	
Final Exam –Date TBD (May 7-13)		Comprehensive final exam: Chapters 21 - 31

Spring 2021 Academic Calendar

January	19	Tuesday	First Day of Classes
January	25	Monday	Last Day to Add/Drop a Class
January	25	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	26	Tuesday	W Grades Posted for Course Withdrawals
February	2	Tuesday	Last Day for 90% Refund, Full or Partial Withdrawal – No Refund for Partial Withdrawal after this date
February	15	Monday	Last Day for 50% Refund, Full Withdrawal
March	8	Monday	Last Day for 25% Refund, Full Withdrawal
March	14	Sunday	Spring Recess Begins - No Classes Scheduled - University Open
March	21	Sunday	Spring Recess Ends
April	2	Friday	Good Friday - No Classes Scheduled - University Closed
April	5	Monday	Last Day to Withdraw
May	4	Tuesday	Friday Classes Meet
May	4	Tuesday	Last Day of Classes
May	5	Wednesday	Reading Day 1
May	6	Thursday	Reading Day 2
May	7	Friday	Final Exams Begin
May	13	Thursday	Final Exams End
May	15	Saturday	Final Grades Due