

Physics 202L

Spring 2022

Office: Luter 304, or online

Office Hours: MW 2:30-3:30pm, Fri 11:00-noon, or by appointment - online on Google Meet

Dr. Edward J. Brash

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594-7451

GENERAL PHYSICS II Laboratory

Text: No textbook is required, but you may find the textbook for Physics 202 to be helpful - OpenStax University Physics – <http://www.openstax.org>

This textbook is freely available online, and there is a print version available on Amazon that is quite reasonably priced. There is also an OpenStax app for your phone or tablet that I highly recommend.

Course Learning Objectives:

This laboratory accompanies the second semester of general physics—a calculus-based introductory physics course. Basic principles of electricity and magnetism are explored.

Topics include electrostatics, electric fields, Gauss's law, electric potential, capacitors, dielectrics, current, resistance, DC circuits, magnetic fields, inductance, AC currents, and special relativity.

This laboratory introduces experimental techniques, data analysis and data analysis tools, and technical report writing utilizing the fundamental physical principles introduced in the lecture portion of the course. Computer use is integrated throughout the laboratory exercise.

This lab is designed to help build your analytical thinking skills. Specifically, it will help you to understand the process of collecting (experimental procedure), interpreting (errors and models), and presenting data (lab reports).

Phys 202 lecture is a co-requisite for this lab. Therefore, if you drop or withdraw from the lecture, the Registrar will automatically remove you from this laboratory course.

Course Logistics

This is a laboratory course that will require you to work with scientific instruments and computers, make measurements and collect data, interpret the data and provide a report of your activities (the “Lab Report”).

You will perform each experiment in teams of two or three students and will work collectively to complete the experiments. Your individual contributions in setting up, collecting and interpreting data, and writing the final report will be recorded and factored into your grade.

Experiments will be split over two weeks. In the first week, I will give a brief introduction, explain the basic theory, and describe the experimental procedure to be carried out. After this, you will set up the equipment, perform any calibrations and other preparations, and begin collecting data. The second week of the lab you will finish

collecting data and begin to compose your written lab report, which is due one week after the second lab.

Most of the important course information, sample reports, data files, analysis notebooks, etc. are or will be posted on my GitHub repository for this course, which you can find at:

<http://github.com/brash99/Phys202L>

Assignments

Assignments Each week you will be responsible for completing a short online assignment consisting of a few questions based on the material in the Lab Handout and Phys 202 lecture.

These will be administered at:

<https://newton.pcs.cnu.edu/webwork2>

Lab Reports *Lab reports are to be written collaboratively by the team that performed the experiment.* (Note, teams may vary from week to week). Instructions are included in each Lab handout. Reports are due one week after the experiment and may be delivered via email to me. Late reports will not be accepted without prior approval. Lab reports should be typed, proofread and edited, and well formatted. Make sure to include: the date of the Lab (not the current date), the Lab number and title, and all coauthors' names. Some examples of well-written lab reports will be posted on my GitHub repo.

Team Member Effort Reports In addition to the team-produced Lab report, each team member should individually complete a "Team Member Effort Report" form and email the completed form directly to me. The form is available as a Word document on my GitHub repo. These forms will count as 5% of your grade.

Calendar of Experiments

Phys 202L Calendar	
<i>Date</i>	<i>Experiment</i>
1/12	1. Coulomb's Law → Virtual
1/19	1. Coulomb's Law → Virtual
1/26	2. Field Mapping
2/2	2. Field Mapping
2/9	3. Electric Force
2/16	3. Electric Force
2/23	4. Ohm's Law
3/2	No Lab
3/9	4. Ohm's Law
3/16	5. RC Circuits
3/23	5. RC Circuits
3/30	6. Lorentz Force
4/6	6. Lorentz Force
4/13	7. LC Circuits
4/20	7. LC Circuits

Grading

I will make your grades available to you throughout the semester, but it is your responsibility to monitor your grade as the course progresses. If you find that you are having trouble, do not hesitate to contact me or the Center for Academic Success (see *Academic Support*, below, or visit tutors.cnu.edu).

I may adjust your Lab Report grade based on teammate feedback and my observation of your conduct and contribution to the group's experiment. Your final numeric grade for the semester will be a combination of your Lab Reports, in-lab assignments, and consistency in submitting Team Member Effort reports, weighted as indicated here:

Item	Weight
Lab 1	10
Lab 2	10
Lab 3	10
Lab 4	10
Lab 5	10
Lab 6	10
Lab 7	10
Webassign Assignments	25
Team Member Effort Reports	5

Letter grades will be determined according to the following (Canadian) grading scale:

≥ 87	A	≥ 63 but < 67	C
≥ 80 but < 87	A–	≥ 60 but < 63	C–
≥ 77 but < 80	B+	≥ 57 but < 60	D+
≥ 73 but < 77	B	≥ 53 but < 57	D
≥ 70 but < 73	B–	≥ 50 but < 53	D–
≥ 67 but < 70	C+	< 50	F

Class Conduct

Please be courteous and respectful during Lab. Please arrive *before* the start time and silence your cell phones. Throughout the lab period, I encourage you to ask me questions about the experiment, topics from your lecture, or Physics in general.

Attendance

You are expected to attend and participate in every Lab. If you must miss a Lab, let me know as soon as possible. Non-excused absences will result in a zero grade for that Lab.

Excusable absences include illnesses verified by a physician, participation in university-sponsored activities (but only with advanced notice), and extreme emergencies documented and presented to me within one week of the Lab.

Academic Honesty

You are required to strictly adhere to the Honor code. Academic integrity includes being honest and treating your classmates, colleagues, faculty and the administration with respect.

As described in the University Handbook and Student Handbook, all members of the Christopher Newport University community uphold and enforce the Honor Code. As such, all submitted work must either represent your own efforts, the efforts of your team, or be acknowledged and documented appropriately when it is the effort of others.

Plagiarism is pretty simple: DON'T PASS OFF THE WORK OF SOMEONE ELSE AS YOUR OWN. If you follow that simple rule, you will be fine!

Honesty regarding all academic issues is both required and expected.

Investigating the Natural World (AINW)

This class may be taken to fulfill part of the requirement for the Investigating the Natural World Area of Inquiry. As an AINW course, this class will introduce students to natural sciences in the modern world. Natural sciences study the physical world and its phenomena. This course will focus on how science is conducted and how scientific knowledge advances in the field of physics. Students in this class will come to understand the process by which scientists gain knowledge about objects, phenomena, the laws of nature, and the laws of the physical world.

AINW Course Learning Outcomes (CLOs)

Students who successfully complete this course will be able to do the following:

- Identify the methods of inquiry that lead to scientific knowledge (AINW: CLO-1)
- Distinguish science from pseudo-science (AINW: CLO-2)
- Make predictions about natural phenomena using theories and models as unifying principles (AINW: CLO-3)
- Analyze and interpret data in a graphical, symbolic, and/or numeric format (AINW: CLO-4)
- Discriminate between association and causation (AINW: CLO-5)
- Identify the types of evidence used to establish causation (AINW: CLO-6).

University Statements

Diversity and Inclusion

The Christopher Newport University community engages and respects different viewpoints, understands the cultural and structural context in which those viewpoints emerge, and questions the development of our own perspectives and values, as these are among the fundamental tenets of a liberal arts education.

Accordingly, we affirm our commitment to a campus culture that embraces the full spectrum of human attributes, perspectives, and disciplines, and offers every member of the University the opportunity to become their best self.

Understanding and respecting differences can best develop in a community where members learn, live, work, and serve among individuals with diverse worldviews, identities, and values. We are dedicated to upholding the dignity and worth of all members of this academic community such that all may engage effectively and compassionately in a pluralistic society.

If you have specific questions, suggestions or concerns regarding diversity on campus please contact Diversity.Inclusion@CNU.edu

Disabilities

In order for a student to receive an accommodation for a disability, that disability must be on record in the Office of Student Affairs, 3rd Floor, David Student Union (DSU). If you believe that you have a disability, please contact Jacquelyn Barnes, Student Disability Support Specialist in Student Affairs (594-7160) to discuss your needs.

Students with documented disabilities are to notify the instructor at least seven days prior to the point at which they require an accommodation (the first day of class is recommended), in private, if accommodation is needed. The instructor will provide students with disabilities with the reasonable accommodations approved and directed by the Office of Student Affairs. Work completed before the student notifies the instructor of his/her disability may be counted toward the final grade at the sole discretion of the instructor.

Success

I want you to succeed in this course and at Christopher Newport. I encourage you to contact me during office hours or to schedule an appointment to discuss course content or to answer questions you have. During the Coronavirus pandemic, our conversations may need to be via electronic means. If I become concerned about your course performance, attendance, engagement, or well-being, I will contact you first. I also may submit a referral through our Captains Care Program. The referral will be received by the Center for Academic Success as well as other departments when appropriate (Counseling Services, Office of Student Engagement). If you are an athlete, the Athletic Academic Support Coordinator will be notified. Someone will contact you to help determine what

will help you succeed. Please remember that this is a means for me to support you and help foster your success at Christopher Newport.

Academic Support

The Center for Academic Success offers free tutoring assistance for Christopher Newport students in several academic areas. Center staff offer individual assistance and/or workshops on various study strategies to help you perform your best in your courses. The center also houses the Alice F. Randall Writing Center. Writing consultants can help you at any stage of the writing process, from invention, to development of ideas, to polishing a final draft. The Center is not a proofreading service, but consultants can help you to recognize and find grammar and punctuation errors in your work as well as provide assistance with global tasks. Contact them as early in the writing process as you can!

You may contact the Center for Academic Success to request a tutor, confer with a writing consultant, obtain a schedule of workshops, or make an appointment to talk with a staff member about study skills and strategies. The Center is located in Christopher Newport Hall, first floor, room 123. You may email academicsuccess@cnu.edu or call (757) 594-7684.

Safety Protocols Specific to COVID-19 and Academic Instruction

Offering in-person instruction on campus requires everyone to take individual responsibility for reducing the risk of exposure for all campus community members both inside and outside the classroom. Irresponsible behavior jeopardizes not only your own health, but also that of your fellow students, friends, professors and advisors, and members of our staff. Therefore, you are expected to learn and diligently follow the safety protocols required by the University at all times. The following protocols apply specifically to instructional spaces and academic buildings.

Prior to leaving their residence hall room or home, students should:

- conduct daily health screenings; and
- pack CDC-approved face covering(s)

Students cannot enter instructional spaces or academic buildings if they:

- are experiencing symptoms of any illness, regardless of whether they believe the illness to be COVID-19;
- are in isolation while waiting for COVID-19 test results;
- have been directed to quarantine by a University or health department official; or
- have been diagnosed with COVID-19 and have not been approved to return to campus by a healthcare provider.

All students must comply with safety protocols established by the university while inside instructional spaces, common areas, and offices. These protocols are subject to change, but as of 16 August 2021 include:

- attend only the classes and sections in which they are officially enrolled;

- sit in their assigned seats or work at their assigned stations every class period;
- wear a CDC approved face covering at all times* (face coverings should cover the nose and mouth, be secured under the chin, and fit snugly against the sides of the face);
- use additional personal protective equipment as required for specific classes;
- refrain from sharing personal materials, such as pens, textbooks, etc., with others;
- follow all directional signs; and
- follow directives regarding office hours and advising appointments.

* *Students who have received an exemption from the face covering requirement for health reasons must present the proof of the exemption provided by the Office of Student Affairs to the instructor upon entering the instructional space.*

Because non-compliance potentially endangers others, faculty members:

- are authorized to instruct anyone in non-compliance with safety protocols to correct the non-compliance or immediately leave the instructional space; and
- may submit referrals to CHECS to report non-compliance with safety protocols.

Faculty members may submit referrals through the Captain's Care Program to report absences as a way of identifying students who may have become ill. It would be appropriate to do so when students have not attended class or communicated with the faculty member in any way for a period of one week or longer.

Course Materials

All content created and assembled by the faculty member and used in this course is to be considered intellectual property owned by the faculty member and Christopher Newport University. It is provided solely for the private use of the students currently enrolled in this course. To ensure the free and open discussion of ideas, students may not make available any of the original course content, including but not limited to lectures, discussions, videos, handouts, and/or activities, to anyone not currently enrolled in the course without the advance written permission of the instructor. This means that students may not record, download, screenshot, or in any way copy original course material for the purpose of distribution beyond this course. A violation may be considered theft. It is the student's responsibility to protect course material when accessing it outside of the physical classroom space.