

CCBC
Spring 2021
SoMS – Physical Science
General Physics III - PHYS 252

CK1- 21788

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General Physics III covers wave motion, transverse and longitudinal elastic waves, electromagnetic waves, physical optics and selected topics in modern physics; builds on PHYS 151 toward a three-semester set of calculus-based courses in the basic principles of physics for students who plan to major in engineering, mathematics or physical sciences.

4 Credits: 3 lecture hours, 3 laboratory hours, and 1 recitation hours per week.

Prerequisite: A grade of C or better in PHYS 151.

Co-requisite: PHYS 251 (May be taken concurrently).

A. Basic Course Information

1. Instructor: Dr Dave Baum
2. Contact information: Catonsville MASH 016 - (443) 840 - 4341 - DBAUM@CCBCMD.EDU (preferred means) - Course Webpage: <http://faculty.ccbcmd.edu/~dbaum/PHYS101S20/PHYS101S20.htm>
3. Office Hours: MF 11:00-12:00 & TWR 1:00 – 2:00 p.m. and by appointment. The Friday hour is *via* Zoom.
4. Contact Turn-around Time: I expect to get back to your eMail inquiries within two work days. Phone messages may take up to a week. I do not respond to messages in BlackBoard.
5. Catonsville Physical Science Dept: 443-840-4560.
6. Class Times, Days, and Locations: TR 9:00-12:20 COMBINED LECTURE/LAB in C-MASH 038.
7. This is a four credit hour course. For each credit hour, the student is expected to complete at least two hours of work per week outside of the class, including doing homework and

practice problem solving, reading, writing laboratory reports, and preparing for exams. Note that these are minimal requirements for any course and that many students require more time than this for science courses. Statement of student out-of-class work expectations

8. Required Materials:

- a) For laboratory courses, appropriate clothing (including shoes that cover the tops of the feet and have good traction) is required. See “Course Procedures” for more information. In addition, you must come with a mask; additional required PPE will be provided by the College.
- b) Ling, Sanny, and Moebis, University Physics, Openstax. The bookstore will sell you a hardbound copy, or you can download a free copy from: <https://openstax.org/details/books/university-physics-volume-3>. The other volumes are available as well.
- c) The Laboratory Manual is available at the Bookstore.
- d) A lab notebook (for example, Ampad #26-251, or any quad-ruled 5 to 1” bound composition book) available from almost any bookstore for about \$1. Do not buy the more expensive lab notebooks you may find.
- e) A cheap scientific calculator that can do trig functions, scientific notation, and natural exponents/logs (about \$10). An \$80 programmable graphing calculator is not necessary. Cell phone calculators are not allowed during exams.

Optional Materials:

- f) The textbook study materials, available at <https://openstax.org/details/books/university-physics-volume-3?Studentresources>
- g) A pair of safety glasses may be needed for some labs. Some common-use goggles will be made available.
- h) It is also recommended that you purchase a regular lined composition book in which to write practice problems.

9. Additional basic information

- a) You may be asked to complete a number of surveys during the semester in addition to the usual course evaluations.
- b) The College requires you to check your College eMail for important messages. Federal regulations require that we must fully determine the identity of the emailing party, and further require that we disclose student information to only the student. In order to meet these requirements for email communication, only emails received from the student’s CCBC email account will get a response. Be sure to send ALL email with your CCBC email account to avoid delays in communicating with your instructor.

B. Course Goals Overall

1. Course objectives: Upon completion of this course, the student will be able to:

- a) analyze arrangements of lenses and mirrors using geometric optics;
- b) apply the laws of geometric optics to problem solving;
- c) apply the theory of optical instruments;
- d) apply the laws of physical optics to problem solving;
- e) apply the laws of elementary quantum mechanics to problem solving;
- f) apply laws of nuclear physics to problem solving;
- g) appreciate the indeterminate nature of the universe through experiment;
- h) solve problems involving the application of the concepts presented to practical situations in western and other societies; and
- i) write coherent and presentable laboratory reports.

2. Major topics:

- a) The Nature and Propagation of Light
- b) Geometric Optics
 - i. Ray tracing
 - ii. Thin lens equation
- c) Optical Instruments
- d) Interference
- e) Diffraction
- f) Special relativity
 - i. Length contraction
 - ii. Time dilation
 - iii. Momentum and energy
 - iv. Doppler effect
- g) Photons, Electrons, and Atoms
 - i. Photo-electric effect
 - ii. Compton scattering
 - iii. Bohr model
- h) The Wave Nature of Particles
 - i. Schrödinger equation
 - ii. Particle in a box
 - iii. Tunneling
- i) Quantum Mechanics
 - i. Hydrogen atom
 - ii. Orbital angular momentum and electron spin
- j) Atomic Structure
- k) Nuclear Physics
 - i. Properties of nuclei
 - ii. Stability and radio-activity
 - iii. Fission and fusion

3. Rationale

This course is part of a three semester sequence. Although it will provide you with some specific knowledge and skills that will be useful to you in your future studies, it is also a vehicle to help you acquire the ability to construct arguments using a logical progression of steps from premise to conclusion and an exercise in clear and concise expression. In addition, this course demonstrates that there are often several ways to model processes and behavior and provides practice in constructing models and realizing the limitation of those models. It is an opportunity to develop the ability to extrapolate and apply current knowledge to new situations.

C. Evaluation

1. Requirements:

- a) The four highest scores of the five exams constitute 64% of your final grade; that is to say that your lowest exam grade will be ignored. There will be NO make-up exams; a missed exam will be given a grade of zero, which will then be dropped as your lowest grade. Situations involving two, excusable, missed exams shall be treated on an individual basis. Your fifth regular exam will occur on final day. Exams may cover any material presented in class or in the textbook, unless a section is specifically omitted. A relationship sheet will be provided for your use. Questions on the grading of an exam must be brought to my attention within a week of the exam's return. You may be asked to present a photo ID at each exam. Seating during exams may be assigned.
- b) Homework assignments, in-class quizzes, and special projects will total 11%. Expect that an assignment will be due at the beginning of every class day; if the assignment is not announced at the end of class, check your e-mail later in the day. Not all assigned problems will be graded. No late homework will be accepted, but some number of homework grades will be dropped in the same manner as for exams. Answers to all assigned problems will be made available for your inspection.
- c) Laboratory work counts 25%. A maximum of two missed laboratories can be made up *per* the procedures listed in the lab manual. There will be at least 11 lab exercises; of these, at least six will require formal lab reports.
- d) There is no extra credit.

2. Grading policy:

Final grades will be calculated as follows:

- ≥ 90% A
- ≥ 80% B
- ≥ 60% C

≥ 50% D
< 50% F

Please note that this system eliminates competition among students, so there is no reason not to help one another. Each student should keep a record of his grades. Students may request an estimated grade at any time.

Also, *please note that a D is a passing grade*; although some programs and courses may require a higher grade, a D will earn you credits toward graduation.

3. Attendance policy:

Attendance is not mandatory, but non-attendance will almost certainly affect how well you perform on assignments. Remember that no late homework assignments or missed exams will be made up, although, some number of homework assignments and your lowest exam grade will be dropped at the end of the semester, and two missed laboratory exercises may be made up near the end of the semester at a common time to be announced. The exception is if you decide to AUDIT the class, in which case attendance becomes mandatory.

4. Audit policy:

You can no longer wait until mid-semester to decide that auditing a course is appropriate; the final date to change to an audit now coincides with the final date for withdrawing with a 50% refund. Failure to participate in the class as an audit will result in a grade of " instead of AU. The last day to change to an 'audit' this semester is: February 19th, 2021.

D. Course Procedures

1. Course-related policies and procedures:

- a) Attendance is not mandatory, but no late homework assignments or missed exams will be made up. *Exception: any student registered as an audit must attend regularly; failure to do so will result in a grade change to either W or whichever letter grade is appropriate for the completed work.*
- b) You will be given a relationship sheet for each exam; a copy is available through the link on the course webpage. You may also find it helpful when doing your homework assignments. Please feel free to ask for additional relationships *during* the exams if you think you need them to complete a problem.
- c) I have not made a detailed list of material to be covered in class, but it is my intention to cover Chapters 1 – 11.
- d) Cheating policy: You are permitted, indeed, encouraged, to consult with classmates on labwork and homework. However, presenting another's work as your own is

considered cheating. You should therefore always present material from a reference source in your own words and credit that source. Collaboration on exams is not allowed; no cell phone calculators are allowed during exams. Any cases of academic dishonesty will be dealt with according to College policies (see Office of Judicial Affairs: <http://www.ccbcmd.edu/judicialaffairs/index.html>).

- e) In accordance with the Americans with Disabilities Act, CCBC is committed to providing equal access to educational opportunities for all students by arranging support services and reasonable accommodations for students with disabilities. A student with a disability may contact the appropriate campus office for an appointment to discuss reasonable accommodations. An appointment must be scheduled within a time period that allows staff adequate time to respond to the special needs of the student. The student must provide the appropriate office with proper documentation supporting the need for reasonable accommodations. Contact Beth Hunsinger in the Office of Disability Support Services at 443-840-1741. Once you are approved, notify me as soon as possible.
 - f) There will be no cell phone activity during class. If you are expecting an important call, be sure your phone is on vibrate and take the call in the hall. There will be no cell phone activity at all during exams.
 - g) No food or drink is allowed in class. Closed-toed shoes are required to provide protection from broken glass, heavy objects, and other hazards. On occasion, safety glasses will be required during laboratory exercises. Failure to abide by this policy shall result in your removal from the classroom.
 - h) This class cannot be recorded without my written permission. A request form is available.
 - i) Anyone who is not officially registered for this class may not attend.
2. For college-wide syllabus policies, such as the Code of Conduct for Academic Integrity, Grades and Grading (including FX and progress grades), and the Audit/Withdrawal policies, please go to the MySyllabiPolicies tab on the [myCCBC](#) page.
 3. To access information about student services, such as Academic Advising, College and Community Outreach/Success Navigators, and Disability Support Services, students may refer to the Student Support Services link on the [CCBC catalog home page](#).
 4. Contact information for course-related concerns: Students should first attempt to take concerns to the faculty member. If you are unable to resolve course-related concerns with the instructor, you should contact Dr Erica L. DiCara, Catonsville Physical Science Coördinator, at edicara@ccbcmd.edu, or at 443-840 4119.
 5. Course calendar/schedule

January 31st – Drop with 100% Refund Deadline

February 15th – EXAM I
February 19th –50% Refund Deadline – Audit Deadline
March 11th – EXAM II
March 15th – May Graduation Application deadline
March 27th – April 5th – Spring Break
April 8th – EXAM III
April 14th – Withdrawal Deadline
April 29th – EXAM IIII
May 15th – August Graduation Application deadline
May 18th – Optional Q Session (11 – 1)
May 20th – EXAM V (9 – 11)
October 1st - Incomplete Makeup Deadline

6. Material in BlackBoard will be available until June 1st.

This syllabus may be changed with notification to the class.

List of Full URLs used in this document:

CCBC Catalog: <http://catalog.ccbcmd.edu/index.php>

myCCBC page: <https://myccbc.ccbcmd.edu/>

Office of Judicial Affairs: <http://www.ccbcmd.edu/judicialaffairs/index.html>

Course Webpage: <http://faculty.ccbcmd.edu/~dbaum/PHYS252S21/PHYS252S21.htm>

Textbook: <https://openstax.org/details/books/university-physics-volume-3>

Ancilliary materials: <https://openstax.org/details/books/university-physics-volume-3?Studentresources>

College Promise: College education that's within reach

With the Baltimore County and Maryland Community College Promise scholarship programs, college-ready, recent high school graduates can attend CCBC full time without the cost of tuition and fees.

As “last dollar in scholarships,” the Baltimore County and Maryland Community College Promise scholarships cover tuition and mandatory fees for eligible students after applying all other financial awards—such as Pell grants, state aid and scholarships.

Awardees may apply the scholarships to a degree or credential sought at CCBC. Students still need to cover other costs such as books, transportation, supplies and materials.

<http://www.ccbcmd.edu/Costs-and-Paying-for-College/Help-Paying-for-College/Scholarships-and-Grants/Promise-Program.aspx>

Get on the right PATHWAY!

Based on declared majors or main areas of interest, incoming CCBC degree — and certificate — seeking credit students are grouped into one of six Pathways:

- Arts
- Business, Law and Education
- General Studies
- Humanities and Social Sciences
- Science and Health Careers
- Technology, Engineering and Mathematics

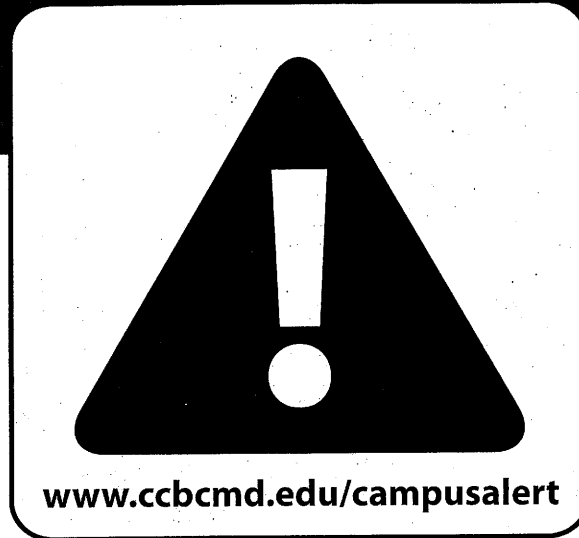
Based on your Pathway, you will receive assistance in course selection as well as student success supports and activities that are geared toward successful degree and certificate completion, transfer and career success.

<http://www.ccbcmd.edu/Programs-and-Courses/Degrees-and-Certificates/Pathways.aspx>

Is campus closed?

Find out before the news stations with CCBC Campus Alert.

Campus Alert is a **free messaging service*** for the CCBC community that keeps you posted when any part of the college is closed.



Might be **bad weather**. Could be a **utility outage** or some other type of **emergency**. Either way, campus alert is a smart and convenient way to get the news and stay safe.

CCBC Campus alert is ideal for:

- Students
- Faculty and staff
- Parents and other family members
- Community members who use CCBC facilities

It's flexible. Campus Alert lets you know what's going on via your choice of:

- Text message to your mobile phone
- Voice call to any phone
- E-mail

It's customizable. You can choose any combination of these contact methods and specify multiple phone numbers or e-mail addresses to make sure you never miss the alert. You can even include contacts for family so that they know what's going on. Plus, you can pick which CCBC campuses and extension centers you want to hear about.

It's private. CCBC uses the system only for emergency campus alerts. Period. And we protect your contact information and will not share it with anybody. Ever.

It's easy to sign up.

Just visit www.ccbcmd.edu/campusalert to learn more and register online now.

* There is no fee to sign up for Campus Alert. However, standard text message and mobile voice rates will apply depending on your service agreement with your mobile carrier.

MAKE THE GRADE SAVE YOUR AID!

What every CCBC faculty and staff member needs to know.

Federal regulations require students to meet GPA and course completion standards, and **many students may be in jeopardy of losing their financial aid.** Without financial aid, some students will be unable to continue their studies at CCBC. This is a serious concern, as **more than half of our students depend on financial aid** to help fund and achieve their educational and career goals.

We need your help!

You have the most direct contact and influence with our students. Please help them understand the importance of maintaining financial aid Satisfactory Academic Progress (SAP). These SAP standards include GPA and course completion. (See reverse.)
Students who fail to meet these standards will lose their financial aid eligibility.

When financial aid is suspended, the student is required to pay his or her tuition, fees and books until the required financial aid SAP standards are met. A student may only appeal if there are extenuating circumstances that can be documented. Many of our students will be unable to cover their educational expenses, so let's work together to help them understand how to maintain their financial aid eligibility.

If a student chooses to withdraw, audit or take an incomplete grade in any course, his or her SAP will be affected. Please encourage any student considering one of these options to visit the Enrollment Services Center (ESC). The ESC will advise the student of how the withdraw, audit or incomplete will impact financial aid. Please note the following:

- Audited courses are not eligible for financial aid.
- An incomplete grade is not considered "passing" until the student completes all required work to earn a letter grade of "A - D."

MAKE THE GRADE SAVE YOUR AID!

Where to direct students for information and help:

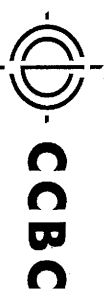
- Visit the student portal, myCCBC, to check grades and financial aid information.
- Go to www.ccbcmd.edu/financialaid/makethegrade.
- Stop by the Enrollment Services Center:
 - CCBC Catonsville – Building F (temporary location during the Spring 2012 semester)
 - CCBC Dundalk – Building A
 - CCBC Essex – Building A
- Call 443-840-CCBC (2222).

Minimum GPA requirements to maintain financial aid eligibility:

If the student attempts (credits/billable hours):	Minimum GPA requirement
1-18	1.50
19-31	1.75
32-44	1.85
45 or more	2.00

A completion rate of at least 67 percent of attempted coursework in both credit and billable hour courses is required. That means earning an "S" (Satisfactory) in Developmental Education courses and an "A - D" grade in credit courses.

Thank you for sharing this important message. Together we'll make sure our students "make the grade and save their aid!"




The incredible value of education.
www.ccbcmd.edu

What to do in an Emergency

CCBC PUBLIC SAFETY

Extension 1111 OR (443) 840-1111

BALTIMORE COUNTY POLICE OR FIRE - 911

<p style="text-align: center;">Active Shooter</p> <p>Run from the sound of gunfire without delay Hide from the shooter if you can't escape Fight the shooter if you must Your life and safety is most important. Do what you must to protect yourself, and get away from the danger immediately Call 911 to report the incident FBI Video: Run. Hide. Fight. Surviving an Active Shooter Event: http://www.fbi.gov/about-us/cirg/active-shooter-and-mass-casualty-incidents/run-hide-fight-video</p>	<p style="text-align: center;">Medical Incident</p> <p>Call 911 to report a medical emergency, including unconsciousness, cardiac or breathing problems. Give your campus, building and room location to the dispatcher. Call Public Safety at 443-840-1111 for immediate assistance. Stay with the person and offer assistance.</p>
<p style="text-align: center;">Classroom Disruption or Fight</p> <p>Call 443-840-1111 or 911 for assistance. Provide the campus, building, and room location. Provide information regarding weapons and a description of participants. Do not try to stop the fight yourself. Quietly encourage others to leave the room.</p>	<p style="text-align: center;">Fire or Building Evacuation</p> <p>For fire or smoke in the building, pull the nearest fire alarm. Shut off gas valves, leave the building, and assist others in the evacuation. Contact 911 with your observations and number and location of the injured. DO NOT go back into the building.</p>
<div><p>CCBC The Community College of Baltimore County</p></div> <p style="text-align: center;">Earthquake</p> <p>As soon as an earthquake or tremor is detected and confirmed, leave the building promptly and move to an open area where a building collapse will not harm you. Take others with you and DO NOT re-enter the building until you are cleared to do so.</p>	<p style="text-align: center;">Classroom Decorum</p> <p>Classroom disruptions are minimized when students and staff work in a cooperative, orderly environment. The following rules must be followed to prevent classroom disruptions:</p> <ol style="list-style-type: none">1. Food and drinks are not permitted in classrooms2. Cell phone ringers must be turned off (vibrate only)3. Electronic devices are permitted with instructor permission only. ALL devices must be turned off during testing.4. Electronic cigarettes are not permitted. They follow the same restrictions as other tobacco/smoking products.
<p style="text-align: center;">Classroom Communication Methods</p> <p>When calling for assistance,</p> <ol style="list-style-type: none">1. Use a college phone to call x1111 or 9112. Use a cell phone to call 443-840-1111 or 9113. Use the EMERGENCY call box in the hallway on each floor to reach Public Safety	