WEST CHESTER UNIVERSITY OF PENNSYLVANIA

ELEMENTS OF PHYSICAL SCIENCE—PHY 100-03—FALL, 2022
MWF 1:00–1:50 pm, SCHMUCKER SCIENCE NORTH, Rm. 191

[Note that our assigned meeting room and building changed after the first class.]

Instructor: Dr. Diana David Chyba

Office: Rm. 332, Science and Engineering Center and the Commons (SECC 332)

e-Mail: dchyba@wcupa.edu ***Ofc. Tel.: 610-436-2494***

Office Hours: Starting 2nd Week of classes—

Monday:	**3:00 pm–4:00 pm**
Tuesday:	**11:00 am–12:00 n; 2:00 pm–3:00 pm**
Wednesday:	**4:00 pm–5:00 pm**
Thursday:	**2:00 pm–3:00 pm**

—Note that my office is in a different building than our classroom—
—If you need to meet outside scheduled office hours, please send an email—
—Meetings via Zoom are possible—
—Occasional cancellations of office hours are likely—

Texts and Other Supplies—*Two books are referenced; one recommended, one required:*

(1) Primary course text—*RECOMMENDED BUT NOT REQUIRED:*

Newton to Einstein: The Trail of Light (An excursion to the wave-particle duality and the Special Theory of Relativity), by Ralph Baierlein (Cambridge and New York: Cambridge University Press, 2001). ISBN-13: 978-0-5214-2323-6; ISBN-10: 0-5214-2323-6 (paper).

(2) *REQUIRED* supplemental reading (you will be assigned to write a short report on this):

Rich, Nathaniel: *Losing Earth: A Recent History*; MCD Publishers 2019; ISBN 978-0-374-19133-7 (hardback). (Available in paper as a Picador Reprint Edition (2020), 978-1-250-25125-1.)

Additional Items Needed: A *stand-alone* "scientific" calculator. The essential feature of a scientific calculator is a provision for directly entering numbers in scientific notation (usually a key or its "2nd

function" labeled "EE" or "EXP"). I recommend the Texas Instruments TI-30Xa or their TI-30XIIS as an inexpensive and easy-to-use calculator having the necessary basic features. (A graphing calculator is *not* necessary. However, a graphing or multi-line calculator does have the advantage of allowing you to enter, examine, and edit an entire mathematical expression prior to evaluation. Complicated expressions are easier to evaluate on such a calculator.) **Note that a calculator which is part of an iPhone, iPad, or other electronic device is *not* allowed to be used for test-taking; only a *stand-alone* calculator may be used for taking an exam.**

A straight-edge may be helpful for making drawings in homework and in lecture notes.

You must have a student account on the WCU computer network so that you can access postings on the "D2L" course information system and so that you can access university e-mail on the campus intranet. E-mail from the course instructor will come to you via the university e-mail system. Registering for a course at the University entitles you to such an account. Instructions for initializing your account can be found via the WCU homepage: click the "Student Life" tab; choose "IT Help Desk" under the "Resources" list; click on the "Service Catalog" link; open the "Services" menu under the "Accounts & Access" heading; finally, click on the first item, "Account Tips for New Students" and follow the directions there. Or go to the corresponding page by entering the following address:

https://www.wcupa.edu/infoServices/studentAccount.aspx

Comments on the textbooks:

Text (1) is the primary textbook; it is on light, the topic around which the classes are organized. Although it has been the basis for my course, I now "recommend" it rather than "require" it. My approach to the material has come to differ more and more from the book, and I had noticed that a sizable portion of students do not buy it, relying on lecture notes and the supplemental material I provide.

Text (2) is intended to broaden the perspective to include an urgently important science- and physics-related social- and government-policy concern: it is a very readable (and I would say engrossing) book on the "recent" history of the global-warming issue. This should make an impression of the urgency of the issue and also provide a bit of the scientific background. I will provide information for reporting on text (2) near the start of the semester. The report will be due late in the semester.

Description of My Version of Physics 100: This is an introductory one-term course emphasizing three themes. The first two themes are the nature of light and the relation of the study of light to other areas of physics. The course develops these first two themes by following "the trail of light" through the history of physics—indeed, a subsidiary aspect of the course is the history of our understanding of these themes. The "trail" begins with some of the properties and behavior of light, leading to the establishment of the wave nature of light. The trail then leads through three or four additional major landmarks in our understanding of Nature which are treated in the course—light as an *electromagnetic* phenomenon and the reality of the *electromagnetic field*. I hope to have enough time toward the end of the semester to touch on additional topics related to light—the *wave-particle duality* of quantum mechanics and Einstein's *Special Theory of Relativity*.

The third major theme is the relation of physics to "science literacy" and to government policy and technological applications. This theme is addressed through the supplemental reading and a report on it [see comments above]. I have decided that climate change is of such critical importance, that I am assigning supplemental reading

specifically on that topic. In addition, after we get far enough into the nature of light, I will use some class time on the "greenhouse effect" that is one of the basic causes of our climate.

The mathematics required for the course consists of basic algebra and geometry. It will be essential for the student to be able to use these skills. Correct use of a scientific calculator, especially in regard to order of operations, will also be essential. (In fact, the first homework assignment will be a review of basic algebra, calculator usage, and geometry.)

Course Style: Primarily I use the whiteboard / chalkboard extensively, so do be prepared to take notes. I have rarely used Power Point. That may change a bit under the current circumstances. I do use classroom demonstrations and sometimes video clips. Sometimes I project an image of a document or drawing. You will need to attend class to know and understand what is going on.

Homework solutions will be written on paper and submitted in class. In some cases early in the semester you will be able to write on a printed answer sheet or on a print-out of the assignment, but in most cases you'll need to use blank paper (not the assignment itself) to write out solutions to calculation problems. Please do not *blindly copy* someone else's homework: odds are some of it will be *wrong*!

Course General Education Goals: PHY 100 is an approved General Education course in the Sciences. As such, it is designed to help students meet the following general education goals:

Goal #1: Communicate effectively.

Goal #2 Think critically and analytically.

Goal #3: Employ quantitative concepts and mathematical methods.

Meeting and Assessing General Education Student Learning Outcomes: The General Education Goals listed above are met by accomplishing and assessing student learning outcomes as follows:

Goal #1: Communicate effectively.

The student learning outcomes in the context of this course include effective self-expression via appropriate college-level written forms. This occurs through written homework solutions, written exams, and a written book report. These modalities also provide assessment. Comprehension of and ability to explain information and ideas accessed through reading are practiced and assessed through in-class discussion and through required supplemental reading resulting in a written book report that entails making notes on the reading and answering open-ended and analytical questions.

Goal #2 Think critically and analytically.

In this course student learning outcomes for this goal include reaching sound conclusions based on logical analysis of evidence and constructing arguments in terms of premises, assumptions, and contexts. These will be accomplished through assigned homework problems and in-class discussion of qualitative and quantitative examples, and practice problems. The assigned supplemental reading presents examples of critical evaluation of scientific data and evidentiary claims. Assessment will be achieved through the assigned homework and written exams.

Goal #3: Employ quantitative concepts and mathematical methods.

Student learning outcomes for PHY 100 are (i) the employment of quantitative methods to examine a problem in the physical world and (ii) the application of the basic methods and thought processes of the scientific method in physical science. These will be accomplished through assigned homework problems and in-class discussion, including quantitative and semi-quantitative examples and practice problems. The assigned supplemental reading on the social and technological impacts of physical sciences and engineering presents examples of critical evaluation of scientific data and evidentiary claims. Assessment will be achieved through the assigned homework and written exams. Both quantitative and qualitative activities, examples, questions, problems, and homework and exam questions are employed so as to encompass and assess both Student Learning Outcomes.

Course Calendar: A tentative course calendar is on the last sheet of this syllabus (pp. 11–12).

Exams: I expect to have 3 exams during the semester, in addition to the final exam (unless we are deluged with snow!) **I will drop the lowest of the three *semester (in-class)* exam scores, but I *will include* the final exam—the *final exam will NOT be dropped*.** The final exam will count the same as each of the two highest semester exams. Prior to each exam I will provide review exercises with answers or solutions.

Altogether, the exams will account for 60% of the course grade; each of the three exams included in the score will thus account for 20% of the course grade. Two of those three exams will be in-class exams, and the third will be the final exam.

The final exam for PHY 100-03 will be given in our classroom (SSN 191) on Friday, December 16, 1:00 pm–3:00 pm. The time for the final exam has been pre-set by the University. ***The final exam is required—the final exam will not be dropped.*** The final exam will count the same as the semester exams. If we cover the topics I hope to, the final will be over the material following that covered by the preceding exam. Otherwise, it may cover some of the same material as the preceding exam(s).

I tentatively expect to have in-class exams ("semester exams") on Fridays of Weeks 5 and 10, and Monday of Week 13 (Thanksgiving Week). As mentioned above, the Final Exam will be on Friday, December 16, during Finals Week (Semester Week 16). I will provide formula sheet(s) with each exam that requires calculations.

I will admit that in the past I have often slipped behind schedule and pushed back the dates for semester exams. The final exam date and time are set by the university and I am not allowed to vary that. If necessary, make-up finals can be arranged on an individual basis—for example, if a student has three finals scheduled on the same day.

Grading: *I plan to grade on the following basis:* ***in-class exams plus final exam, 60% of the total grade (20% for each of the two highest in-class exams and 20% for the final); report on the supplemental reading, 20%; homework assignments, 20%.***

This is tentative, so I reserve the possibility of eventually varying these proportions but it is unlikely that they would change by more than 5% of the overall grade, if at all. I *may* "curve" particular exams *if* I think that is appropriate, but again, I do not normally do this. My initial plan is for all exams included in the overall average to count equally, but I may vary this if it seems appropriate. I will let you know if I consider any of the preceding class-wide changes. I do not plan to grade on attendance this semester.

Final numerical scores will be converted to letter grades according to the official scheme, but I may adjust the scheme based on how the class does and on how difficult I perceive the course to have been. I do consider whether to adjust the letter grades of students whose numerical scores are close to letter-grade boundaries, and considering factors such as unusual performance in some particular aspect of the course, major illness, etc.

Make-up Exams: I am willing to allow make-up of semester exams for sufficiently good reasons, such as illness or emergency. Missing the *final exam* will result in a zero for the exam unless extreme circumstances apply. ***The following rules apply to making up semester exams:***

> ***IMPORTANT: To limit possible abuse of the make-up exam privilege, I will REQUIRE the following:***
>
> - ***I must be notified in person, by telephone, or by e-mail by the day after the semester exam, if you need to make up the exam at another time for any reason.***
> - ***The make-up exam must normally be taken not later than six days from the exam date. Exceptions will be made only for truly serious reasons, such as extended illness, and must be explicitly granted by me.***

If you miss an exam without making it up in time and without an exemption from me, your grade for that exam will be zero.

Regarding Homework Assignments: Please note that the preceding percentages mean that if you do very little or no homework, you will not receive an 'A' or 'A–' for the course even if you do very well on the exams. If you do not do the homework, and do not do well on the exams, your final grade will necessarily be low. Aside from the direct effect of the homework on your course grade, doing the homework, thinking about it as you do it, and understanding errors in your solutions will help you avoid errors on the exams!

You, Me, and the Course: You are responsible for spending the "time on task" to do the work you need to do for this course. A teacher can encourage "active learning," but in the last analysis, active learning must be done by the student. If thinking of the entire semester at once is burdensome, focus on the current material!

I do NOT provide "extra credit" work late in the semester. *If you are tempted to hope for or rely upon "extra credit work" to pull you through, think of the current course material as your extra credit work as we go through the semester. I do understand that there may be many demands on your time, and I will try to be understanding and flexible. For grades to be meaningful as indicators of student performance, however, they must be based primarily on mastery of the course material and assignments, secondarily on effort made to achieve mastery, and, perhaps, thirdly on other factors.*

I am very willing to provide help and explanations inside and outside the classroom (see "Office Hours" in the header information on page one). Whether you are a recent high-school graduate or working on starting a second (or third!) career, I'm interested in you. Students have found me to be very helpful in one-on-one and small group situations, so walk in or make an appointment to see me if you need help.

Electronics in the Classroom: ***Turn off all cell phones, iPods, iPads, iPhones, Kindles, laptops, etc., before class. If you are expecting to receive an emergency call, set your cell phone to vibrate mode and answer the call outside the classroom. You are not allowed to use cell phones, etc., for texting, gaming, doing assignments, etc., during class; these activities are distracting to your classmates and to the instructor. If I observe this I may or may not warn you before asking you to leave the classroom. If you wish to occupy yourself with these activities during class time, do not come to class!!***

Possible exceptions may include use of an electronic device as an accommodation for a disability (or under certain other conditions). These situations should be discussed with me on an individual basis. Because of privacy considerations, I may allow a particular student to use an electronic device without explanation to other students.

University's Statement of Excused Absences Policy for University-Sanctioned Events: Undergraduate students participating in University-sanctioned events such as, but not limited to, the Marching Band, musical ensembles, theatre group, athletic events, forensics competition, etc., will be granted an excused absence(s) by the respective faculty members for class periods missed. Students will be granted the privilege of taking, at an alternative time to be determined by the professor, scheduled examinations or quizzes that will be missed. The professor will designate such times prior to the event. Professors can provide a fair alternative to taking the examination or quiz that will be missed. Students must submit original documentation on University letterhead signed by the activity director, coach, or adviser detailing the specifics of the event in advance. Specific requirements include the following:

1. Responsibility for meeting academic requirements rests with the student.
2. Students are expected to notify their professors as soon as they know they will be missing class due to a University-sanctioned event.
3. Students are expected to complete the work requirement for each class and turn in assignments due on days of the event prior to their due dates unless other arrangements are made with the professor.
4. If a scheduled event is postponed or canceled, the student is expected to go to class.
5. Students are not excused from classes for practice on nonevent days.

The following are specifics for the student athlete:

1. The student athlete is expected, where possible, to schedule classes on days and at hours that do not conflict with athletic schedules.
2. Athletes are not excused from classes for practice or training-room treatment on nongame days.

Recently the University presidents of the Pennsylvania State Athletic Conference (PSAC) voted to allow athletic contests and championships to be played during the PASSHE final exam period. This new development may impact administration of finals, since multiple day championships will now occur during WCU's final exam week. Under WCU's Excused Absence Policy, any athlete who is participating in an athletic event or championship must be allowed to take, without penalty, any exam or quiz that they miss due to competition or be offered a fair alternative.

Disabilities and Special Needs: If you have a physical disability, learning disability, test anxiety, etc., please contact the Office of Services for Students with Disabilities (OSSD) at extension 3217 and bring the resulting documentation to me to discuss how the university and I can assist you. Note that sufficient notice is needed in order to make accommodations possible.

In an effort to assist students who either receive or may believe they are entitled to receive accommodations under the Americans with Disabilities Act, and Section 504 of the Rehabilitation Act of 1973, the University has appointed a student advocate to be a contact for students who have questions regarding the provision of their accommodations or their right to accommodations. The advocate will assist any students who may have questions regarding these rights. Ms. Lynn M. Klingensmith, Director of Social Equity/Title IX Coordinator, has been designated in this role. Any students who may need assistance with their rights to accommodations should contact her at lklingensmith@wcupa.edu.

If you are approved for an accommodation of a disability, please provide me the documentation in a timely manner. Even if you think you may not need the accommodation for this course (such as extra time for exams), please provide the documentation—it may well turn out that you need the accommodation after all! If you need to contact OSSD for the documentation, do so AS SOON AS POSSIBLE. Delaying exams or other coursework while awaiting documentation will make the work more difficult later! See my similar note below regarding tutorial help (next subsection).

Tutoring: Tutoring for PHY 100 is offered by the Learning Assistance Center (LARC), 223 Lawrence Center, x2535. More information is available at: http://www.wcupa.edu/ussss/larc/. LARC tutoring is free of charge, but you must sign up at the beginning of the semester.

Peer tutoring may also be offered by physics majors during the semester. If offered, this will not be organized until a few weeks into the semester. I will provide information as I learn about arrangements. A few weeks into the semester you could also inquire at the Physics Library, Merion 125, where the physics major hang out.

If you realize you need tutorial help, arrange it as soon as possible, and keep up with it. Delaying or missing tutoring appointments will lead to greater difficulty later. If you need tutoring in connection with a learning disability, see my similar note above under the "Disabilities and Special Needs" subsection.

Academic Integrity: It is the responsibility of each student to adhere to the University's standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another's work and/or using ideas of another and presenting them as one's own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in automatic failure and removal from this course.

For questions regarding Academic Dishonesty, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to their major department's handbook, the Undergraduate Course Catalogue, the Rams Eye View, or the University Web Site. Please understand that improper conduct in any of these areas will not be tolerated and may result in immediate ejection from the class.

Recording in Class: You must obtain permission from me before recording class. I expect I'd happily give permission for a screenshot of the whiteboard, etc.–you'd need to catch me before I erase it anyway. Video recording that includes your classmates requires their permission as well. Any on-line posting of such recordings, or circulation of such recordings to people not enrolled in the course, is *forbidden*, unless *additional special permission* is granted.

Intellectual Property Statement: The instructor for this course utilizes copyrighted materials under the "Freedom and Innovation Revitalizing United States Entrepreneurship Act of 2007" (Fair Use Act). Apart from such copyrighted materials, all other intellectual property associated with this course is owned and copyright

protected by the instructor, including, but not limited to, lectures, course discussions, course notes and supplementary materials posted or provided to students authored by the instructor, assessment instruments such as quizzes and exams, and Power Point presentations. No recording, copying, storage in a retrieval system, or dissemination in any form, whether electronic or other format, by any means, of the intellectual property of the instructor, either in whole or in part, is permitted without the prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of finals in the semester in which this course is held.

Links and references to on-line resources provided by the instructor may lead to other sites. The instructor does not sponsor, endorse, or otherwise approve of any information appearing in those sites, nor is the instructor responsible for the availability of, or the content located on or through, external sites. Apart from materials used in accordance with the Fair Use Act, the instructor takes no responsibility for material that is otherwise offered at web sites and makes no warranty that such material does not infringe on any third party rights. However, should any of this type of material be present and this fact is brought to the attention of the instructor, they will remove references to it from course materials.

Public Safety: The Emergency Communications Committee recommends that the telephone number of WCU's Department of public safety be available on every course syllabus.

WCU Department of Public Safety: (610) 436-3311.

The University encourages students to sign up for the University's free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone (as well as via email). For more information, visit https://www.wcupa.edu/wcualert/.

I encourage students to attend an ALICE training session if an open enrollment session is offered by the University Police (part of the Department of Public Safety). ALICE training provides awareness of useful and non-useful tactics in active-shooter and similar situations involving assailants.

Resource Pantry Statement: West Chester University faculty and staff want to see all students succeed, and we know that financial needs can be a significant barrier to success. We are working to address economic insecurity among our students in a number of ways. In particular, West Chester University now has a resource pantry on the ground floor of Commonwealth Hall for students who lack access to adequate food, personal care items (soap, toothpaste, etc.), school supplies, and professional attire. Resources are also available for students experiencing housing insecurity. For more information on obtaining resources from the pantry, please visit: https://wcupa.edu/pantry or speak with me.

Inclusive Learning Environment and Anti-Racist Statement: Diversity, equity, and inclusion are central to West Chester University's mission as reflected in our Mission Statement, Values Statement, Vision Statement and Strategic Plan: Pathways to Student Success. We disavow racism and all actions that silence, threaten, or degrade historically marginalized groups in the U.S. We acknowledge that all members of this learning community may experience harm stemming from forms of oppression including but not limited to classism, ableism, heterosexism, sexism, Islamophobia, anti-Semitism, and xenophobia, and recognize that these forms of oppression are compounded by racism.

Our core commitment as an institution of higher education shapes our expectation for behavior within this learning community, which represents diverse individual beliefs, backgrounds, and experiences. Courteous and respectful behavior, interactions, and responses are expected from all members of the University. We must work together to make this a safe and productive learning environment for everyone. Part

of this work is recognizing how race and other aspects of who we are shape our beliefs and our experiences as individuals. It is not enough to condemn acts of racism. For real, sustainable change, we must stand together as a diverse coalition against racism and oppression of any form, anywhere, at any time.

Resources for education and action are available through WCU's Office for Diversity, Equity, and Inclusion (ODEI), DEI committees within departments or colleges, the student ombudsperson, and centers on campus committed to doing this work (e.g., Dowdy Multicultural Center, Center for Women and Gender Equity, and the Center for Trans and Queer Advocacy).

Guidance on how to report incidents of discrimination and harassment is available at the University's Office of Diversity, Equity and Inclusion.

University Statement Regarding Title IX of the Education Amendments of 1972, Including Policy on Faculty Reporting Incidents of Sexual Assault: West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator, Ms. Lynn Klingensmith. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred, to the person designated in the University protection of minors policy. **Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence** is set forth at the webpage for the Office for Diversity, Equity, and Inclusion at https://www.wcupa.edu/_admin/diversityEquityInclusion/. Ms. Klingensmith, Director for Equity and Compliance and Title IX Coordinator in that office, may be contacted at jklingensmith@wcupa.edu.

LGBTQIA+ Ally Statement: West Chester University's Mission Statement says, in part, "*We appreciate the diversity the members of our community bring to the campus and give fair and equitable treatment to all; acts of insensitivity or discrimination against individuals based on their race, gender, ethnicity, age, sexual orientation, abilities, or religious beliefs will not be tolerated*."

Based on West Chester University's commitment to diversity, I believe that everyone in my classroom should feel safe. I have completed the University's Lesbian, Gay, Bisexual, & Transgender Ally training. In becoming an ally I made the commitment to offer a safe space for *all* of my students, not just those who identify as LGBTQ. You may speak to me confidentially about issues of sexual orientation or gender identity during my office hours, but I have no professional expertise in these matters. For further advice or information, I recommend contacting Ms. Tiffany Gray, Director of LGBTQA Services (tgray@wcupa.edu, 610-436-2090), or University Counseling and Psychological Services (wcucc@wcupa.edu, 610-436-2301).

Appendix A: Options for Smartphone Scanning Apps

In case you need to email a copy of a hand-written assignment, please do NOT send a photograph—send a scan file in .pdf format.

Smartphone Scanning-App Options. If you do not have a scanner at home, you can download an app on your smartphone. There are number of apps available. Two of my colleagues have passed on recommendations. There is also a "Notes App" on the iPhone which has a "built-in" scanning capability—instructions for using it are below, in item (3) near the end of this list of options.

(1) One of my colleagues has used an app called ***Turboscan*** for years and finds it to work very well. Turboscan is a very easy and affordable app, and it comes in both iPhone and Google versions. My colleague is recommending it to students and wrote "Turboscan is $5.99 and well worth the cost!":

https://apps.apple.com/us/app/turboscan-pro-pdf-scanner/id342548956?mt=8&ign-mpt=uo%3D4

https://play.google.com/store/apps/details?id=com.piksoft.turboscan.free&hl=en_US

(2) Here are another colleague's suggestions regarding generating PDF's from phones:

> **(a)** ***Adobe Scan*** is a free app for your phone that can take pictures and turn them into a PDF document. Here is more information about the Adobe Scan free app:
>
> https://acrobat.adobe.com/us/en/mobile/scanner-app.html
>
> (This colleague did need to link it to their gmail account as they set it up.)
>
> **(b)** Students also recommend ***CamScan*** (https://www.camscanner.com/) but my colleague has not tried it.

(3) ***How to Scan Documents Using the "Notes" App on iPhones*** (*** **iPhone Users** ***)
(Credit: Briana Melvin)

1) Open the Notes app on your iPhone.
2) Tap the icon in the bottom right to create a "new note".
3) At the bottom of the screen, press the camera icon.
4) Select "Scan Documents".
5) It will go to the camera screen. Place the full page of your document under the camera. Make sure there is enough light on the document so the camera picks up every word.
6) Press the white button to scan each page. Multiple pages can be scanned.
7) Save the note. Send the note to your email.
8) Download the file from the email onto a computer. Upload the file from the computer to the D2L Dropbox and submit!

(4) One of my students recommended an app called ***Genius Scan*** they'd used in architecture school.

Tentative Course Calendar—

Week No.	Starts on Monday,	Coursework, Exams, and Other Events *[References to "text" below are to* Newton to Einstein… *by Ralph Baierlein.]*
1	Aug. 29	Monday, August 29, is the first day of classes. Introduction. Speed of light (Sec. 1.2 of text); speed, distance, time calculations. Homework 1 posted on D2L Thursday evening.
2	Sep. 5	**Monday, Sep. 5, is the Labor Day holiday.** Start waves (text Chap. 3). Homework 1 due Friday, Sep. 9. Format for book report on supplemental reading (on Rich, *Losing Earth*) to be posted. Homework 2 assigned. *Tue., Sep. 6, is the last day to enroll in a course or to drop a course.*
3	Sep. 12	More on waves, including calculations, "superposition" concept (text pp. 62–63), and standing waves (if time allows; not in text). Homework 3 assigned.
4	Sep. 19	Finish wave basics (including standing waves if time allows). Begin wave interpretation of light this week or next. Review Exercises for Exam I posted on D2L.
5	Sep. 26	Begin or continue wave interpretation of light; "interference" phenomenon (text C. 4). **Exam I on speed-distance-time calculations for light, and on wave basics (Sec. 1.2 & Chap. 3) on Friday, September 30.**
6	Oct. 3	"Interference" of light, cont'd (text Chap. 4).
7	Oct. 10	"Interference" and related matters in the wave interpretation of light, cont'd. Homework may be assigned.
8	Oct. 17	**Fall Break—Mon., Oct. 17–Tue., Oct. 18.** Finish "Interference" (text Chap. 4). Homework may be assigned.
9	Oct. 24	Begin electricity and magnetism (text Chap. 5, "Electromagnetic Waves"). Review Exercises for Exam II posted. *Wed., Oct. 26 is the last day to withdraw from a course ('W' grade on transcript).* *Fri., Oct 28, is last day to request pass-fail or audit status and is the date when remaining 'NG' grades flip to 'F'.*
10	Oct. 31	Continue Chap. 5 on electricity and magnetism ("E & M"), and electromagnetic waves. Any remaining homework on "interference" will be returned by Wednesday. **Exam II on interference and on light as a wave (text Chaps. 3, 4) on Friday, November 4.**

(cont'd)

Week No.	Starts on Monday,	Coursework, Exams, and Other Events
11	Nov. 7	Continue/finish text C. 5 on electricity, magnetism, and electromagnetic ("EM") waves. Review Exercises for Exam III posted (over E & M and EM waves—text C. 5 material).
12	Nov. 14	Finish Chap. 5 if necessary. Introduce special theory of relativity (text Chaps. 8-10).
13	Nov. 21	**Exam III on electricity, magnetism, and EM waves (text C. 5) on Monday, Nov. 21.** Book report, on Rich: *Losing Earth*, may be submitted early on D2L. **Thanksgiving Holidays—Wed., Nov. 23–Sun., Nov. 27.**
14	Nov. 28	Special theory of relativity continued—topics from text Chaps. 8–13 as time allows. Book report, on Rich: *Losing Earth*, may be submitted early on D2L. .
15	Dec. 5	**Book report, on Rich: *Losing Earth*, due Monday, December 5, 11:59 pm, on D2L.** Special theory of relativity concluded if not concluded during Week 14. Chapters 6, 7 overview—Photoelectric & Compton Effects; photon concept and "wave-particle duality" ("quantum physics"). Review Exercises for Final Exam posted. *Monday, Dec. 5, is the last day for term withdrawal (withdrawal from <u>all</u> courses).*
16	Dec. 12	**Monday, Dec. 12, will be the last day of classes for the Fall Term.** More on quantum physics and/or physics of atmospheric "greenhouse effect". Possibly additional Review Exercises for Final Exam will be posted. ***Finals Week. Final Exams will be Tue., Dec. 13, through Sat., Dec. 17.***

<u>Our Final Exam will be in our classroom, SSN 191, at 1:00 pm–3:00 pm, Fri., Dec. 16.</u>

<u>The final exam is required—the final exam grade will NOT be dropped.</u>

The Final Exam will be on whatever we actually cover after the Exam III material (and may include some material from Exams I–III if we don't cover much additional material due to falling behind the schedule above).