The University of Texas at Tyler
University Physics II
PHYS 2326
Spring 2024
RBN 3035
MWF 11:15 AM – 12:10 PM

Instructor	Dr. Richard Batman, Ph.D.
Office	RBN 4045
Phone	(903) 566-7477 (I prefer email to phone calls.)
Email	rbatman@uttyler.edu **(Never attempt to contact me through the Canvas system. You must send emails directly to rbatman@uttyler.edu. Please include the course number 2326 in the body of each email.)**
Office Hours	My office hours this semester will be held at the following times: MWF 10:10 – 11:10 T 12:15 – 1:15 R 3:00 – 4:00 (**Or by appointment.** Times are approximate. Please stop by my office anytime you have questions, even outside of office hours**.** I'll almost certainly be available to help.)
Textbook	*Physics for Scientists and Engineers*, 5th ed., Knight, ISBN 978-0-136-95629-7. In addition to buying this book, each student must pay to register for the MasteringPhysics online homework system at https://mlm.pearson.com/northamerica/masteringphysics/ , using course I.D. **batman70632**. MasteringPhysics will give you the option of buying a digital version of the textbook. When last checked, the homework subscription with textbook included was about $120. Digital versions of the 4th edition of the textbook are also available elsewhere online; you can get access instructions from the bookstore. **You are required to bring to each lecture session the textbook and a scientific calculator that has a screen less than one inch in height and no graphing or equation solving capability.** (Most TI-30s are acceptable, particularly the TI-30X IIS. Any calculator with one or more buttons labeled, "Solv," is not acceptable. **For example, the TI 36-PRO may not be used**.) **If you do not have such a calculator, you are required to buy one. It must be set to display answers in scientific notation. You may not use a calculator with a larger screen or graphing or equation solving capability on any quiz or exam.**
Prerequisite	MATH 2414 (Calculus II).

Course Topics

This course will stress the application of physical concepts and principles to solving elementary physics problems. It is intended to develop the problem-solving skills that are necessary for

success in advanced courses or standardized exams in physics. Major topics covered will include oscillations, waves, electricity, and magnetism.

Math Background Requirements

Calculus II is a prerequisite for this course. Students should be able to differentiate and integrate polynomials and trigonometric functions. Further math skills will be developed as needed. **If you feel uncomfortable with any of the math discussed, please inform me immediately.** I will help you individually, or, if the class as a whole has a problem with a particular topic, I will address the topic during class.

Communication Policy

All students are required to frequently check the announcements on the Canvas website for information and notifications that will need to be posted between class sessions. You will be held responsible for acting in accordance with all such communications. Lectures will generally be based on PowerPoint presentations posted in advance on Canvas, which you will be required to download prior to class. Be sure to check the Canvas website just before each lecture to see whether a new one has been posted.

Homework, Quizzes, and Exams

1. Each homework assignment will be administered by the MasteringPhysics website at https://mlm.pearson.com/northamerica/masteringphysics/). **Assignment #1 in MasteringPhysics ("Introduction to MasteringPhysics") will not affect your grade. However, all later assignments will affect your final grade and must be completed by their deadlines. You will receive no credit from me or from Mastering (zero points) for problems completed after the deadline for any assignment.**
2. **The only way to learn physics is to spend a lot of time solving homework problems. Since physics generally builds on what came before, it is essential not to get behind in the homework. Remember that homework is 20% of your semester grade!**
3. Here are some tips for making the homework a learning experience:
   (a) Don't get solutions online. Solve the problem yourself.
   (b) One of the main purposes of lecture is to prepare students to solve homework problems. If you don't immediately know how to solve a homework problem, look back through your lecture notes for the corresponding section in the textbook/PowerPoint to recall the method that was presented in class for solving this particular type of problem. **Follow the indicated method of solution carefully and exactly. It is designed to help you avoid making common mistakes, and, if you don't follow it to the letter, you will probably not solve the problem successfully.**
   (c) If you can't find the correct method of solution in your lecture notes, contact me by email or come to my office to get help well in advance of the deadline for the assignment.
   (d) If you follow the correct method but make a mistake and arrive at an incorrect result, **please either come to my office for help, or email me a photograph of your**

work, so that I can find the mistake. Please do not send me an email that contains no information, except for a problem number and a request for help.

4. Tips for studying for exams:
   (a) Don't waste your time memorizing equations. You'll be given all the equations you need (and several you don't need) on exams and quizzes.
   (b) Sets of review and practice problems will be posted prior to every exam. **The only effective way to study for an exam is to solve as many of these problems as possible prior to the exam.** Simply reviewing solutions to problems that have already been solved for you will not give you the necessary practice. You must apply the methods taught in class to several problems you've never seen before.
   (c) Start working on review and practice problems well before the exam date. If you can't get the correct answer for a particular problem, contact me immediately.
5. Tentative dates of exams and quizzes are noted in the "Tentative Semester Schedule" later in this syllabus. You will not be permitted to wear a hood, hat, headphones, ear buds, air pods, etc., while taking any quiz or exam.
6. Exams will include any material we have covered up to that point, including problems worked in class or given as homework or in quizzes. Regular exams will be semi-cumulative, in the sense that they will focus on material covered since the last exam but will also necessarily include material that came before. The final exam will be fully cumulative and will cover the entire semester.
7. Remember that homework and quizzes are worth 20% and 18% of your semester grade, respectively, so **doing well on exams will not necessarily ensure a passing semester grade. You must also be diligent in successfully completing homework and quizzes**.

Late Assignments and Make-Ups

1. Late homework will generally not be accepted, except when I notify you otherwise about a particular assignment or when I judge that there are very good reasons (*e.g.*, severe illness, family emergency, *etc.*) for giving an extension to a particular student. I cannot guarantee in advance that an extension will be given in a particular situation. (As stated above, **you will receive no credit from me or from Mastering (zero points) for problems completed after the deadline for any assignment**.) **To have a chance of getting an extension for a given assignment, you must send me *by email* a notification and detailed description of your situation, along with a request for an extension, within one week after the submission deadline. The sooner, the better.** Late notification is grounds for denying an extension. No more than three homework extensions will be given to any student during the semester.
2. **For exams and quizzes, make-ups are generally allowed for excused absences only. I cannot guarantee in advance that a make-up will be allowed in a particular situation. Do not assume, without first discussing the circumstances with me, that your absence from a quiz or exam will be excused.** For anticipated excused absences, you must make arrangements **before your absence** to make up the assignment. For unanticipated excused absences in which an exam or quiz is missed, it is your responsibility to arrange a make-up for the assignment. I will not remind you. **Failing to send me *by email* a notification and detailed description of your situation, along with a request for a**

make-up, within one week after a missed exam or quiz, is grounds for denying the make-up. Please send the notification ASAP. No more than two exams (including the final) can be made up during the semester, and no more than three quizzes. (A make-up is defined as taking a quiz or exam at a different time from the rest of the students, whether it is taken before or after the regularly scheduled time.) **Remember that quizzes are worth 18% of your semester grade.**

3. **It is your responsibility to check your grades on Canvas frequently throughout the semester and to notify me immediately if there are any errors** (incorrect point values, missing grades, etc.) in the grade book. **After semester grades have been submitted for the course, no corrections will be made without documentary proof of the error. No assignments of any kind will be accepted or made up on or after the day that semester grades are due to be submitted**.

Graded Work and Assessments

1. **The "Total" column of the Canvas grade book does not accurately show your current, overall course grade. The Canvas grade book shows accurate grades for individual assignments only.**
2. **You are responsible for keeping all your graded work in good condition throughout the semester**, just in case I need it later as proof of your performance (see item 3 in the previous section).
3. Please look over your exam and quiz results and ask questions about your grades during my office hour (not during class) if you think there's a grading error, or if you don't understand what you did wrong.

Grading Scale

A	90-100%
B	80-90%
C	70-80%
D	60-70%
F	<60%

Semester Assessment

Regular Exams	44%
Homework	20%
Quizzes	18%
Final Exam	18%

Student Academic Conduct

During quizzes and exams, students are to work alone and not help each other or refer to outside sources of information. Cheating will not be tolerated.

Tentative Semester Schedule

Please note: numbers in parentheses given after lists of topics in the schedule below refer to the appropriate sections in the book *Physics for Scientists and Engineers*, 5th ed., Knight.

Week 1	**Jan 15**: **No class for Martin Luther King Day.** **Jan 17**: Introduction to the course. **Jan 19**: Simple harmonic motion; energy in simple harmonic motion. (14.1 – 14.3)
Week 2	**Jan 22**: Dynamics of simple harmonic motion; simple pendulum. (14.4 – 14.6) **Jan 24**: Physical pendulum; damped oscillations; driven oscillations and resonance. (14.6 – 14.8) **Jan 26**: **Quiz 1**; The wave model; 1-D waves; longitudinal waves. (20.1 – 20.2)
Week 3	**Jan 29**: Sinusoidal waves; string waves; 2-D and 3-D waves. (20.3 – 20.4) **Jan 31**: Sound and electromagnetic waves; index of refraction; power, intensity, and decibels; the Doppler effect. (20.5 – 20.7) **Feb 2**: Superposition; standing waves. (21.1 – 21.3)
Week 4	**Feb 5**: **Exam 1 Review** **Feb 7**: **Exam 1** **Feb 9**: Standing sound waves; 1-D interference. (21.4 – 21.6)
Week 5	**Feb 12**: **Quiz 2**; Interference in 2-D and 3-D; beats. (21.7 – 21.8) **Feb 14**: Charge model; electrical properties of materials; charge; insulators and conductors. (25.1 – 25.3) **Feb 16**: Coulomb's law; electric field; electric field of a point charge. (25.4 – 25.5)
Week 6	**Feb 19**: **Quiz 3**; Electric field of multiple point charges; electric field of a dipole. (26.1 – 26.2) **Feb 21**: Electric fields of continuous charge distributions. (26.3 – 26.4) **Feb 23**: **Exam 2 Review**
Week 7	**Feb 26**: **Exam 2** **Feb 28**: Parallel plate capacitor; motion of a charged particle in an electric field; motion of a dipole in an electric field. (26.5 – 26.7) **Mar 1**: Electric flux. (27.1 – 27.3)
Week 8	**Mar 4**: **Quiz 4**; Using Gauss's law; conductors in electrostatic equilibrium. (27.4 – 27.6) **Mar 6**: Electric potential energy; potential energy of point charges. (28.1 – 28.2) **Mar 8**: Electric potential energy of a dipole; electric potential; potential inside a parallel-plate capacitor. (28.3 – 28.5)
Week 9	**Mar 11**: **No class for spring break.** **Mar 13**: **No class for spring break.** **Mar 15**: **No class for spring break.**
Week 10	**Mar 18**: **Quiz 5**; Electric potential of a point charge; potential of a charged sphere; potential of multiple point charges. (28.6 – 28.7) **Mar 20**: Relationship between potential and field; sources of electric potential; finding field from potential. (29.1 – 29.3) **Mar 22**: **Exam 3 Review**

Week 11	**Mar 25**: **Exam 3** **Mar 27**: Conductor in electrostatic equilibrium; capacitance and capacitors; capacitors in series and parallel. (29.4 – 29.5) **Mar 29**: Energy stored in a capacitor; dielectrics. (29.6 – 29.7)
Week 12	**Apr 1**: **Quiz 6**; Magnetism; magnetic field; magnetic field of moving charges. (32.1 – 32.3) **Apr 3**: Magnetic field of a current; magnetic dipoles; Ampere's law; solenoids. (32.4 – 32.6) **Apr 5**: Magnetic force on a moving charge; magnetic force on current-carrying wires; forces and torques on current loops. (32.7 – 32.9)
Week 13	**Apr 8: Quiz 7**; Induced currents; motional emf; magnetic flux. (33.1 – 33.3) **Apr 10**: **Exam 4 Review** **Apr 12**: **Exam 4**
Week 14	**Apr 15**: Lenz's law; Faraday's law; induced fields. (33.4 – 33.6) **Apr 17**: Interference of light; Young's double-slit experiment; diffraction gratings; single-slit diffraction. (22.1 – 22.4) **Apr 19**: Reflection; refraction; total internal reflection. (23.1 – 23.3)
Week 15	**Apr 22**: **Quiz 8**; Image formation by refraction; color and dispersion; ray tracing for thin lenses. (23.4 – 23.6) **Apr 24**: Thin-lens equation; image formation with spherical mirrors; polarization. (23.7 – 23.8, 34.7) **Apr 26**: **Final Exam Review.**
Week 16	**Apr 29**: **Final Exam 10:15 AM – 12:15 PM in usual classroom.** **May 1**: **No class.** **May 3**: **No class.**

Important COVID-19 Information for Classrooms and Laboratories

It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure (CDC quarantine/isolation guidelines). Please work with your faculty members to maintain coursework and please consult existing campus resources for support.

Recording of Class Sessions

Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should

not be shared outside of the course in any form without express permission. **I am not planning to record or telecast any lectures this semester, except to provide legally required accommodations or as necessary to compensate for COVID restrictions imposed by the university.**

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).
Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

i. "Cheating" includes, but is not limited to:
   - copying from another student's test paper;
   - using, during a test, materials not authorized by the person giving the test;
   - failure to comply with instructions given by the person administering the test;
   - possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
   - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
   - collaborating with or seeking aid from another student during a test or other assignment without authority;
   - discussing the contents of an examination with another student who will take the examination;
   - divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;

- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)

A more complete description of university policies is given at the following website: https://www.uttyler.edu/academic-affairs/files/syllabuspolicy.pdf.

The census date, which is the last day to drop without a W, is Monday, Jan 29.

Please do not offer me any gifts, because I am not allowed to accept them.

Course Objectives/Student Learning Outcomes

1. **Critical Thinking Skills** (includes creative thinking, innovation, inquiry and analysis, evaluation and synthesis of information). The student will demonstrate the ability to think critically and to use appropriate concepts to analyze qualitatively problems or situations involving the fundamental principles of physics.
2. **Empirical and Quantitative Skills** (includes the manipulation and analysis of numerical data or observable facts and results in informed conclusions)**.** The student will demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.

Online Physics Resources

1. http://www.masteringphysics.com/site/index.html
2. http://lightandmatter.com/
3. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
4. http://www.physicsclassroom.com/
5. http://ocw.mit.edu/courses/physics/8-01t-physics-i-fall-2004/lecture-notes/
6. http://ocw.mit.edu/courses/physics/
7. http://www.splung.com/
8. http://www.phyfun.com/
9. http://www.walter-fendt.de/ph14e/
10. http://www.falstad.com/mathphysics.html
11. http://physics.merlot.org/
12. http://www.edinformatics.com/il/il_physics.htm
13. http://galileo.phys.virginia.edu/classes/109N/more_stuff/Applets/home.html
14. http://webphysics.davidson.edu/Applets/Applets.html