COURSE PREFIX 2426.001 University Physics II

COURSE SYLLABUS: Spring 2019

INSTRUCTOR INFORMATION

Instructor: **: Dr. Bahar Modir**
Office Location: STC 343
Office Hours: TBA
Office Phone: 903-886-5359
University Email Address: bahar.modir@tamuc.edu
Preferred Form of Communication**: Email**
Communication Response Time: 48 hours

COURSE INFORMATION

Textbooks: MasteringPhysics with Knight, Physics for Scientists and Engineers, 4th edition. You have the option of buying MasteringPhysics with etext only **(ISBN 9780134083148)**, MasteringPhysics with etext and looseleaf copy of the physical text **(ISBN 9780134092508)**, or MasteringPhysics with etext and traditional textbook **(ISBN 9780133953145)**.

McDermott, Tutorials in Introductory Physics Workbook and Homework package **(ISBN 9780130970695).**

PHYS 2426 Lab manual, available at the campus bookstore

Course Description

Physics 2426 is the second semester of a calculus-based physics sequence. University Physics II introduces electrical and magnetic phenomena in nature, including the concepts of electrical charges, electric and magnetic fields, the application of Gauss' Law, electric potential, conductors and insulators, currents, basic circuits, and induction.

The *syllabus/schedule are subject to change.*

University Catalog Description

Second semester of calculus based physics with topics in electricity and magnetism for science, mathematics, and engineering students. Prerequisites: PHYS 2425 with a minimum grade of C, MATH 2413. Additionally, MATH 192 or concurrent enrollment.

Student Learning Outcomes (Should be measurable; observable; use action verbs)

Students will be able to demonstrate the following skills when analyzing situations involving electrostatic fields and potentials and their sources, currents, voltage, capacitance, power, basic electrical circuits, magnetic fields and their sources, and induction:

1. Students will be able to conduct qualitative analysis of electromagnetism problems which demonstrates conceptual understanding as measured by performance in visualizing problems through diagrams, estimating answers, assessing and justifying answers, analyzing graphs and clear, written explanations.
2. Students will be able to perform quantitative calculations in situations involving electric and magnetic fields, and demonstrate knowledge of the relevant basic units, vector addition, and application of basic calculus. Students will be able to assess answers to questions for plausibility.
3. Students will be able to use simple laboratory demonstrations and computer simulations to explain the basic properties of electric and magnetic fields, and electrical circuits.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Students should be able to use myLeo Online, MasteringPhysics, view videos on YouTube and use Excel. Use of graphing calculators is encouraged.

Instructional Methods

This class is being taught in studio mode. Studio mode is a student-centered active learning environment that blends lecture time with lab time. Lecture and/or readings will be used to introduce topics. Students are encouraged to ask questions during lecture. However, the majority of class time will be focused on group activities. Activities will include conceptual work, labs, and problem solving. Activities will be completed in groups of 3-4. The instructor will assign groups. Groups will be changed 2-3 times during the semester. The instructor, learning assistant and graduate assistant will go from table to table, frequently sitting and observing your discussion. Our role is to help

you ask the right questions that lead to you solving the problems yourselves.

Physics education research has shown that students learn best when actively engaged in class. Studio mode has been implemented at many universities and has been found to have positive impacts on conceptual understanding and problem-solving ability.

Course Design and Critical Thinking (Problem Solving) Skills

I'll just take a moment to explain the reason why we teach the class in so-called studio mode. Many students who take this course will not pursue advanced physics degrees (although some will) and many of you will not often directly use most of the physics concepts taught in the course in your careers. But what you *will* use is your ability to be able to analyze a problem using multiple methods – qualitatively, conceptually, quantitatively - to simplify it to its fundamental essence to solve it, then systematically add more complexities until you've solved your original problem. No matter what your eventual career, this is what you will be doing, and is what employers are looking for. Employers consistently rank critical thinking and problem- solving ability near the top of their list of desired traits in valued employees. We have redesigned the course to focus on these universal skills; as a bonus, research has shown that focussing on such skills leads to greater conceptual understanding in physics! In Bloom's taxonomy of cognitive skills, this class focusses the 3 higher-level thinking skills highlighted below.

Bloom's Taxonomy of the Cognitive Domain:

1. **Knowledge**- memorization of facts, words, and symbols
2. **Comprehension**- understanding the meaning of knowledge
3. **Application**- applying concepts to various situations
4. **Analysis**- breaking apart complex ideas in to parts, determining how parts relate to each other and to an overall structure
5. **Evaluating**- making judgements based on criteria and standards through checking and critiquing
6. **Creating**- putting individual ideas together to form a complete explanation; creating a new pattern or approach

Memorization of equations and rote problem solving will not get you very far in this class. In tutorials, group problems, and on a lot of test questions, only about 50% of the points on offer go for picking the right equation, plugging in numbers and getting the right answer. You will have to demonstrate understanding: explain what answer you expect before solving the problem, drawing clear and fully labeled diagrams, explaining things using graphs, and justifying your answers. These are skills we will practice all the time in class, and you will be required to use them on tests. The class period is the time when you should be using the LA, GA and myself to acquire these skills.
And that is what this class is about: acquiring skills. And just like in sports, for example, you can't learn skills by someone getting up and lecturing to you. You only acquire skills by practicing them time and again under the guidance of a coach. In this class, you will practice by working on problems – many of them – and the LA, GA and myself are your coaches.

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Class sequence:

The subject matter is divided up into a sequence of 10 topics, each addressed by 1 chapter in the textbook *Physics for Scientists and Engineers*. We will spend about 4 class periods on each topic.
You will need to read the chapter before we cover the material in class. To encourage you to do this, you will be required to complete online reading quizzes by 11.59pm the night before we begin to cover the material in class. I will announce in class when each new reading quiz is available, and when it is due. These quizzes count towards your final grade. Out of the 4 classes we spend on each chapter, approximately two classes will be spent on mini-lectures and group problem solving, one class on a tutorial from the "*Tutorials in Introductory Physics*" workbook, and one on a lab/PhET simulation/real-world problem(s). Every couple of classes you maybe asked to reflect, as a group, on what you have learned from a particular chapter or in a tutorial, and share with the rest of the class. This will be used to guide discussion and mini-lectures. You will also be able to share problem areas and homework problems you are having problems with, and we can discuss them.

A note on reading the textbook: Many students take the wrong approach to reading textbooks; they try and read and understand every word, refuse to move on until they've understood everything in the present section, refuse to skip passages, and only read the material once. Reading textbooks is a skill: here is one of several good websites with instruction on how to acquire that skill.
http://www.dartmouth.edu/~acskills/success/reading.html

When reading textbooks, the aim is not to understand everything right away. You will likely need to read the chapters several times before and after covering the material in class to really feel like you're getting the material (I always had to read textbooks half a dozen times for the content to begin to sink in). The first time you read the chapter, you should skim it (this is the "preview" read discussed in the above website). Let the reading quiz guide you and try and pick up what are the major concepts, equations, and laws you are required to understand to answer problems. After we cover a chapter in class, you can re-read the chapter and pick up on the things you missed/didn't understand the first time through. Bear in mind that the textbook now fills the role of much of the traditional lecture.

A note on "physics is hard" from Dr. Matt Wood: Yes, it is. It is for everyone, and it was for me (it was for Einstein, too). Some of you come from high school with great physics teachers and a lot of funding – you've had AP physics and calculus and are very well prepared. Many of you don't have this background at all. You may be in a group with someone that does, and they're "getting it" quickly while you're still struggling. This doesn't mean that the other person is innately talented and you are not – in most cases it just means that they have spent more time doing math and physics in the past than you have. You can do it – you just need to put in the time. This "genius" narrative – mistaking background for ability – can particularly negatively affect women and underrepresented minorities due to existing stereotypes about these groups. In studio physics, we are hoping you will feel proud about yourself and your accomplishments. You can feel ownership for

your contributions to your group; proud of your improvement; proud of challenging yourself; proud of your ability to discuss physics concepts with others, and more. Want to read more about this? Follow this link: http://www.aas.org/cswa/status/status_2015jun.pdf and read the essay on page 7 by Dr. Angela Little.

Finding Help

The **class period** is intended to be the time when you acquire *understanding*. The laws and equations you can read in the textbook; in the class you will learn the skills to apply them to problems and assess your answers. You will acquire these skills by actively working in groups to work through tutorials and solve problems. You will be learning from your group mates, from our Learning Assistant and Graduate Teaching Assistant, and from myself.
Outside of class, you are encouraged to come to office hours for help on any aspect of the course. At any point in the semester, if you have any questions, send me an email (bahar.modir@tamuc.edu) or stop by my office (STC 343).
Also, our Learning Assistants and Graduate Assistant are happy to help – just talk to them after class, email them, or head down to the Physics Lounge (room 111) where other physics students are happy to help.

A note about asking questions: Just because you read the textbook and work the problems doesn't mean you'll understand the material completely. You will frequently have questions to ask my LAs, GAs and I. If you have done sufficient reading and working on the subject, you will be able to ask very specific questions that we can help you with. For example:

Do ask questions like "I don't understand how to choose the variable to integrate over when applying Coulomb's law to calculating the electric field of extended charge distributions"

Do not ask questions like "I don't get Coulomb's law. What's the deal with it?"

The latter question tells me you haven't put any effort into understanding the material, and is too vague for me to answer.

To succeed in this class

The biggest predictor for success in this (and any) class is the time, thoroughness, and effort you put into the work and reading set. The harder you work, the better you'll do. Therefore you need to aim to
- Attend all classes, and participate fully in group work
- Complete and turn in all the work on time
- Read the textbook thoroughly, in the most efficacious way (see above)
- Take advantage of all the extra credit
- Ask for help when needed, and make sure you questions are specific

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Student Responsibilities or Tips for Success in the Course

The vast majority of class time will be spent working in groups. Students are expected to participate fully in group-work in their assigned roles.

Students are expected to have completed the reading by the due date.

Students are expected to take notes on all problems you solve in class, any notes shared by other groups on whiteboards. For work displayed on whiteboards, the easiest thing to do is to just take photos of the work using camera phones. All students are expected to complete the tutorial worksheets; although the in-class tutorials are not graded, you will need complete worksheets to do the tutorial homework and to revise for the exams.

GRADING

Final grades in this course will be based on the following scale:

Grades will be based on five components:

Item	Percentage of Class Grade
In-class group assignments	17%
Reading Quizzes	4%
Tutorial Homeworks	17%
MasteringPhysics Homework	12%
Midterm Exams	37.5% (3×12.5%)
Final	12.5%

Grading Scale: (**NOTE:** Grades are not curved in this class – what you get is what you get!)

90 % < A
80 % < B < 89.9999 %
70 % < C < 79.9999 %
60 % < D < 69.9999 %
F < 60 %

Assessments

Exams: There will be three midterms and a final. See the course outline for *estimates* of exam dates. Make-up exams will only be allowed for excused absences. See course policies below for details on excused absences. You will be allowed “cheat sheets” prepared by you in each exam – one piece of letter-sized paper (front and back) with any formulas, examples, and anything else you feel like putting there.

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See the course outline for exam dates.

ALL types of problems you encounter in class or on homework will be encountered on exams – everything you do is essentially practicing towards the exam.

MasteringPhysics Homework: About 11 homework assignments will be assigned throughout the semester. Homework will be submitted through the MasteringPhysics online homework system. The due date will be displayed in MasteringPhysics and announced in class.

Tutorials Homework: About 6-9 homework assignments will be assigned throughout the semester from the, *"Tutorials in Introductory Physics"* homework book. Homework is due at the beginning of class. Late homework will not be accepted. Your lowest tutorial homework grade will be dropped. Tutorial homework will generally be due **two classes** after it is assigned. **NOTE:** Tutorial homework solutions are not distributed; questions that posed particular difficulty will be discussed in class (you are welcome to suggest questions to discuss). If you have questions about a particular solution, you should ask me during office hours.

In-class/reading assignments: The grade is from a combination of in-class problem solving (graded according to the problem solving rubric at the end of the syllabus) and occasional labs worksheets (some of which will be graded according to the lab rubric given at the end of the syllabus). Assignments will be completed as a group, and each member will receive the group score, modified by the results of peer assessment. More information about how in-class work is graded will be provided in a separate document. **NOTE:** I do not distribute solutions to the in-class problems, so make sure you take notes as you are doing the problems, and when we discuss them afterwards. **NOTE II:** In-class assignments that you miss due to absences cannot be made up.

Reading Quizzes: About 11 online quizzes will be assigned throughout the semester. The online reading quizzes will be submitted through the MasteringPhysics online homework system. Your lowest reading quiz will be dropped. **NOTE:** I do not distribute solutions to the quizzes.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

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LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:
https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

The best method to reach the instructor is through email. You can send an email to bahar.modir@tamuc.edu with PHYS 2426 in the subject line. If you do not receive a response within 48 hours, send a reminder email.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

1. Cell phone use is only allowed if used for class activities.
2. **Eating is not allowed**. However, covered drinks are allowed.

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3. Attendance will be taken by seating chart at the beginning of class.

4. The instructor must be notified by email about any excused absences **no later than 24 hours after the missed class**. Even if you choose to notify the instructor in person, you **must still follow up with email** within 24 hours of the missed class. If you do not follow this policy, you will not be able to make up missed exams or turn in late work except in extreme circumstances. Excused absences include those for illness, school-sponsored events, other emergencies deemed unavoidable by the instructor.

5. You are responsible for obtaining notes and class announcements from missed classes.

6. Excessive absences may result in being dropped from the course.

7. When emailing the instructor, include the **course and section number in the subject line**.

9. You are expected to check your email at least once a day for class announcements. Emails will be sent to the email addresses you provided to MyLeo. Notify the instructor if you would prefer to receive emails at a different address.

11. Students should fully participate in class activities.

12. Students are expected to be professional and respectful and take responsibility for their learning. If you find yourself struggling, the instructor, GA and LAs are available to provide extra help outside of class.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

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Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:
https://www.britannica.com/topic/netiquette

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Office of Student Disability Resources and Services

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http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

COURSE OUTLINE / CALENDAR

Content schedule

Weeks 1-4	Electric Force and Electric Field
Weeks 5-7	Gauss's Law
Weeks 8-10	Electric Potential
Weeks 11-12	DC Circuits
Weeks 13-15	Magnetic Fields and Inductions

Exam dates

Exam 1	Fri., 2/15
Exam 2	Fri., 3/15
Exam 3	Fri., 4/19
Final Exam	Mon., 5/10 8:00-10:00

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Exam dates are tentative and may be adjusted depending on the pace at which we cover material.

Group Problem Solving Activity Rubric

Each problem on the assignment is worth 16 points total. The assignment of the 16 points is determined by the following rubric. The total possible score for an assignment will be determined by multiplying the number of items times 16. This score will then be converted to a percentage.

Points	4	2	0
Model/ Visualize	• There is a clear, fully labeled picture/diagram which takes up at least ½ page of letter size paper and represents quantities accurately • Assumptions are listed. • Quantities are labeled with symbols. • Relevant equations are listed • The quantity to find is stated. • If the answer(s) are a number, make a ballpark estimate of the answer before you start trying to solve it	1-2 or more of the required elements are missing.	3+ of the required elements are missing
Solve	• Specific symbols are placed in equations • The equations are solved with sufficient working **and clarity** shown to see how you arrived at the answer. • Appropriate number of sig figs is used throughout working • A complete explanation in words (in complete sentences) is provided when appropriate.	1-2 of the required elements is missing.	3+ of the required elements are missing
Assess	• Units are explicitly checked. • You have explicitly checked the answer agrees with the order-of-magnitude estimate if required • You have evaluated the reasonableness of the answer with a real-world comparison • Correct significant figures are used • Reflect on your method and answer: describe what the purpose of the question was (why were you doing it?) and what your answer means	1-2 of the required elements is missing.	3+ of the required elements are missing
Correctness	Over 2/3 of the work (pictures, diagrams,	1/3 – 2/3 of	Less than 1/3

	equations selected, solutions, etc) is correct.	the work is correct.	of the work is correct.

Lab Activity Rubric

The lab is worth 10 points total. The assignment of the 10 points is determined by the following rubric. This score will then be converted to a percentage.

Points	2	1	0
Pre-lab questions: Quality of answers	Answers are **mostly** correct, with clear, logical reasoning where necessary	**Some** correct answers and reasoning, but some are incorrect, or the explanations are incorrect or are not logical.	**Few or no** correct answers and reasoning,
Pre-lab questions: Completeness	Responses to **most or all** questions are complete. When a written explanation is required, complete sentences are used.	Responses **some** questions are incomplete. When a written explanation is required, complete sentences are not used. Some of the writing is unreadable, word choice is inaccurate, and errors severely impede communication.	Responses to **few or no** questions are complete. When a written explanation is required, complete sentences are not used. Some of the writing is unreadable, word choice is inaccurate, and errors severely impede communication.
Quantitative lab results:	**Most or all** numerical results are correctly recorded, with appropriate units. It is clear what which part of the experiment, and which quantity, each number refers to, and they are organized in an easy-to-follow way. Graphs have correctly labeled axis, a title, are easy to read, and correct. Appropriate significant figures and errors included	**Some** numerical results are recorded incorrectly. Some have units missing, it is unclear what some numbers are referring to, and it is not always easy to follow. Graphs are missing axis labels, or titles, or are difficult to read, or contain some errors. Appropriate significant figures and errors sometimes missing.	**Few or no** results are recorded correctly. Most have units missing, or it is unclear what most numbers are referring to, and it is mostly difficult to. Graphs are missing labels and contain multiple errors. Appropriate significant figures and errors are largely missing.
Qualitative lab results: Quality of written results,	**Most or all** qualitative results clearly communicated in complete sentences, and organized in a clear way.	**Some** qualitative results are incompletely communicated, do not use complete	**Few or no** qualitative results are completely communicated, do not use complete

sketches and diagrams		sentences, and are difficult to follow as a result of poor organization.	sentences, and are difficult to follow as a result of poor organization.
Post lab questions/ conclusions	Responses to **most or all** questions are complete and correct, and draw upon the results of the lab for support. Any required conclusions are communicated clearly with logical support from lab results.	Responses to **some** questions are incomplete or incorrect, and miss support from lab results. Some required conclusions are unclear, incomplete, and lack logical support from lab results.	Responses to **few or no** questions are complete or correct. Most miss support from lab results. Most required conclusions are unclear, incomplete, and lack logical support from lab results.

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