Course Syllabus

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Syllabus Navigation

PHY 3063

COURSE SYLLABUS

COURSE DETAILS

CONTACT INFORMATION

Instructor: Prof. Tarek Saab
Office: NPB 2354
Email: Use **Canvas email**
Class hours: Tue, Thursday, Periods 2&3 (8:30am–10:25 pm), NPB 1011
Office hours: See availability times in the Instructors and Office hours page

WEBSITE

All of the material and announcements for this course will be posted on the course's Canvas website. This includes the syllabus, an up-to-date calendar, topic list and assignments. The web site for the course is accessed through UF e-Learning or directly at: **https://ufl.instructure.com/courses/347830**.

Web access: You will need a laptop or tablet to participate in and carry out some of the in class activities. Plan on bringing your device to each class. (You may use a smartphone if you wish, however, the screen size can be limiting). If you do not have access to a compatible device, we will work on finding a way to accommodate you.

TEXTBOOK

The required text is **Modern Physics**, 2nd Ed by Randy Harris (Pearson/AddisonWesley). ISBN-13 978-0-8053-0308-7.

You may also find the following textbook to be useful:

1. **Modern Physics**, by Paul A. Tipler and Ralph A. Llewellyn (W.H. Freeman, 2008). Any available/used 4th, 5th or 6th edition is fine.
2. **Modern Physics for Scientists and Engineers**, by Taylor, Zafiratos, and Dubson. Any available/used 2nd edition is fine.

PREREQUISITES

PHY2061 or equivalent and MAP2302

Background: It is expected that students are comfortable with calculus including vector calculus, differentiation, integration, and trigonometry. Students should also be able to solve ordinary differential equations.

DESCRIPTION

This course will provide an introduction to the foundations of modern physics, namely relativity, quantum mechanics and statistical physics, that emerged in the early 20th century. We will look at how "scientific theories" are provisional and evolving, dependent on an interplay between theoretical reasoning and experimental measurement and discuss how the major experimental discoveries of the time spurred the development of new theories to understand them. As time permits, we may look at applications of modern physics in currently active areas of physics such as condensed matter, particle physics, and astrophysics.

This course adopts the "flipped classroom" format, wherein there will be no formal lectures during class time. Students are expected to do the necessary preparation, including, but not limited to, reading the relevant material prior to coming to class and completing the pre-lecture online quiz. Class room time will be used primarily for working on the group based projects and problem sets as well as for live demonstrations of relevant physical phenomena.

COURSE SCHEDULE

The detailed course schedule, including the topics covered, and exam dates is available at this page: **Course Schedule**.

COURSE STRUCTURE

The work you will be doing as part of this course consists of a combination of *pre-class* individual preparation, *in-class* individual and group based problem solving, and *out-of-class* group based projects.

1. Pre-Class Individual Preparation:
    a. **Comments/Questions about the Modern Physics textbook:**
    You will be writing your own notes, summarizing concepts from the text book, commenting on the material, asking questions and answering other students' questions. This activity will typically be due every week, prior to the first time a given topic is addressed in class.

    Purpose: The purpose of this activity is to provide you with a first exposure to the relevant material so that the in-class time can be used for more in-depth, applied work. This will also allow me to survey the class's overall understanding of the material and tailor the following class appropriately.

    Evaluation: Your contributions to "Commenting/Annotating the E&M textbook:" will be evaluated on quality (thoughtfulness), quantity, and timeliness. See the Assessment section for details.

    b. **Pre-class online individual quizzes:**
    Prior to each class period there will be a short quiz (delivered via Canvas) based on the topics you will be working on in the upcoming class. The questions will primarily be short and conceptual in nature. Some of these questions will be delivered in class via the Learning Catalytics platform.

    Purpose: The purpose of this activity is to provide you with direct feedback on your understanding of the of the material. The questions are tailored to help you identify any gaps in your preparation and to allow me to directly address any issues/difficulties/misconceptions during the class period.

    Evaluation: Your performance of the online quizzes will be a part of the final grade. This is primarily meant to give you an incentive to keep up with the material. See the Assessment section for details.

2. In-class activities: Rather than just "re"-presenting the content of the textbook to you, class time will be used to build on the knowledge acquired during you individual preparation. In-class activities will consist of:

a. **“Live" demonstration and discussion of modern physics phenomena.**

Purpose: Unlike mechanics, electromagnetism can be a very abstract and mathematical topic. Additionally, there is typically little opportunity to experience and interact with electromagnetic phenomena in day-to-day life. Demonstrations can provide significant credibility and insight into the material.

b. **Guided problem solving.**

Purpose: Although there are many ways to approach and solve problems, and the best ones for you tend to be the ones you develop yourself, it can be useful to observe the strategies and techniques of an experienced* practitioner in the field. Some of these examples will also be available to view on video at your convenience.
(*Warning: this does not mean that the instructor is infallible. We make mistakes all the time.)

c. **Order of magnitude estimates of effects in real world applications.**
Working in groups, you attempt to determine (to the nearest order of magnitude) quantities/values. Rigorous derivations and blind guessing are not useful, and this is the only instance when just looking things up online is not allowed.

Purpose: Estimation skills that are of fundamental important to learning and using physics. Estimations fall into two categories: 1. Mathematical estimation: Often, working with an exact analytical function is not practical and knowing how to approximate the function’s behavior for small or large value of a variable is very useful. 2. Physical estimation: Many physical values are impossible to determine exactly, e.g. How many total electrons are there on Earth, or what is the net charge of a typical person, but can be determined with sufficient accuracy (i.e. order of magnitude) to allow for meaningful calculations.

Evaluation: This will be conducted in a group based competition format with the winning group getting bragging rights, however, this will not factor in the determination of your final grade.

d. **Formal problem set work (in individual and group formats).**
Your group will be given (ahead of time) a set of problems to solve. Each group member is responsible for preparing one problem before coming to class. In class you will work with your group to complete the problems, identify and correct any errors in your or your group mates’ problems, resolve any conceptual difficulties associated with the material.

Purpose: Develop your problem-solving skills and allow for self-assessment of your knowledge.

Evaluation: Your performance in this activity will factor in the determination of your final grade.

Your work is evaluated both on the effort you put into the application of problem solving steps and the correctness of the solution. See the Assessment for details.

e. **In-class group quizzes.** We will have an in-class quiz roughly every two weeks. The format will be similar to the formal problem sets in that you will initially work individually and submit your own responses, then you will convene with your group to discuss your solutions and arrive at a single agreed upon solution for the group.

   Purpose: To keep everyone on track in learning the basic concepts and ensure that you have the necessary background to carry out the project and other class activities.

   Evaluation: Your performance in this activity will factor in the determination of your final grade. Your total score is based equally on your performance in the individual and group portions. See the Assessment for details.

f. **Group project work.**
   You will perform one project, due at the end of the semester, as part of a group. You will receive a project brief that details the goals and guidelines for that project.

   Purpose: To transfer the knowledge and you've gained to more than just 8x11 sheets of paper. You will work with your group to produce a particular "final product", as well as give a presentation and a written report on your final product.

   Evaluation: Your performance in this activity will factor in the determination of your final grade. The project presentation and project reports will both be evaluated. See the Assessment for details.

ASSESSMENT

Your grade is determined by the continuous assessment of the class activities throughout the semester. Your performance (for all of the activities) will be evaluated on a 2 point scale:

Points	
0	Inadequate work for the specific activity
1	Adequate work, but some improvement is needed
2	Meets expectations for the specific activity

3	Significantly exceeds expectations (given only for the most exceptional cases)

Each activity will contribute up to 2 points to your total score. For the group based activities all members of a group will receive the same score, however, to encourage teamwork and avoid the temptation of letting other group members do the heavy lifting, you will also receive a peer evaluation score by your group members.

Category	Activity	Points
Preparation	**Commenting/annotating the textbook**	0—2
	Online & In-class Individual Quiz	0—2
Demonstrating Proficiency	**In-class Group Quiz**	0—2
	In-class problem sets	0—2
Application of acquired knowledge	**Project**	0—2
Team work	**Attendance**	-2—+2

ATTENDANCE POLICY

Since the majority of evaluated work will take in place during the course lecture time, and since all group members will receive the same credit for work done as part of the group, regular attendance is an essential aspect of this course and will be a used in determining your overall course grade.

Please consult the official **University Policy for Attendance (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)** , linked from the UF Registrar's web site.

GRADING SCALE

The course grades are not curved (i.e. your letter grade only depends on your total score). Your letter grade for the course will be determined as follows:

Letter Grade	Total Points
A	10
A-	9
B+	8
B	7
B-	6
C+	5

C	4
C-	3
D+	2
D	1
E	0

Point breakdown:

Category	Activity		Points		
			0	1	2
Preparation	**Commenting / annotating the text book**	Quality	Does not demonstrate any thoughtful reading of the chapter	Demonstrates reading, but no (or only superficial) interpretation of the chapter	Demonstrates thorough and thoughtful reading AND insightful interpretation of the chapter
		Quantity	Fewer than 3 thoughtful comments	3–5 thoughtful comments that are concentrated in a few sections	>5 thoughtful comments that touch upon each section of the chapter
	Online & In-class Individual Quiz	% of total points	<50%	50%-80%	>80%
Demonstrating Proficiency	**In-class Group Quiz**	% of total points	<50%	50%-80%	>80%
	In-class problem sets		50% or less completed or significantly worked out problems	50%-80% completed or significantly worked out problems	>80% completed or significantly worked out problems
Application of acquired knowledge	**Project**	Details will be provided at the beginning of each project			
Attendance		<50%	50%—75%	75%—80%	80%—90%	>90%
		-2	-1	0	+1	+2

Note: A grade of C- is not a qualifying grade for major, minor, Gen Ed, or College Basic distribution credit. For further information on UF's Grading Policy, see:

- **https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx#hgrades**

(https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx#hgrades)

- http://www.isis.ufl.edu/minusgrades.html (http://www.isis.ufl.edu/minusgrades.html)

MAKE-UP POLICY

The schedule for in-class quizzes will be announced well in advance of the event. Missing a quiz will automatically result in a score of 0 for that item. Since quizzes are a group activity, it is not feasible to give make-ups to individual students for missed quizzes.

If you foresee having to miss a quiz due to reason that is approved under UF attendance policies please let the instructor know in advance. In the case of an unforeseeable absence, i.e. due to a medical excuses or family emergencies, please contact the instructor as soon as possible, normally within 24 hours after the missed quiz. In those cases an appropriate and equivalent means of making up the missed work will be provided.

If you miss classes where group related homework or project activity occurs you will have to make arrangements with your group members about making up the work.

HOW TO SUCCEED IN THIS COURSE

For tips and suggestions on how to approach this class and the appropriate amount of work required to master the topics we'll be covering see the page: **How To Study For PHY3063**

UF POLICIES

ACADEMIC HONESTY

The UF Honor Code applies to all aspects of this course. It is required that you report any possible infractions to your instructor immediately.

Violations of the UF Honor Code, including any identified online homework related academic fraud, will be processed to the full extent of the Honor Code. If the Dean of Students Office confirms a first violation, the automatic minimum penalty will be a failing grade in the course. Otherwise, the student will be referred to the Director of Student Conduct and Conflict Resolution. According to the Honor Code, a student who receives a course grade penalty is not permitted to withdraw from the course.

All University of Florida students are required to abide by the **University's Academic Honesty Guidelines** (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) and by the Honor Code:

The Honor Pledge

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied:

"*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*"

Full documentation about the honor code can be found at the following link:
https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/
(https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/)

ACCOMMODATING STUDENTS WITH DISABILITIES

Students requesting classroom accommodation for disabilities must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor (Dr. Biswas or Dr. Saab) when requesting accommodation. You will need electronic ATR forms for exams and for quizzes. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

More information about the Disabilities Resource Center can be found at **https://www.dso.ufl.edu/drc** **(https://www.dso.ufl.edu/drc)**.

OTHER INFORMATION

OUTSIDE HELP SERVICES

The Teaching Center in Broward Hall (tel. 392-2010) offers a range of free services, including individual tutoring in physics.

COUNSELING AND MENTAL HEALTH RESOURCES

Students facing difficulties completing the course or who are in need of counseling or urgent help should call the on-campus Counseling and Wellness Center (352-392-1575; **http://www.counseling.ufl.edu/cwc/** **(http://www.counseling.ufl.edu/cwc/)**).

ONLINE COURSE EVALUATION PROCESS

Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at **https://evaluations.ufl.edu (https://evaluations.ufl.edu)** . Evaluations are typically open during the last two or weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at **https://evaluations.ufl.edu/results (https://evaluations.ufl.edu/results)** .

Course Summary:

Date	Details	
Tue Aug 22, 2017	**Classes Begin! (https://ufl.instructure.com/calendar?event_id=624225&include_contexts=course_347830)**	8:30am to 10:25pm