PHY 1001: Physics 1, Spring 2023, Sect. 03 (&05 &06)

Syllabus

(03) Class meets Mon/Tues/Thurs/Fri from 11:00-11:50 AM in OEC 118
(05) Class meets Mon/Tues/Thurs/Fri from 1:00-1:50 PM in OEC 118
(06) Class meets Mon/Tues/Thurs/Fri from 2:00-2:50 PM in OLS 129

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Office: Room 236, Olin Physical Sciences

Office Hours: Mon/Tues/Thurs/Fri, 12:00 – 12:50 PM, or email to arrange a time

Course Objectives:

- Provide an understanding of the fundamental principles and techniques used in physics. Develop abilities to: think critically, solve problems, process information, communicate effectively, and present clearly.
- Includes vectors, mechanics of particles, Newton's laws of motion, work, energy and power, impulse and momentum, conservation laws, mechanics of rigid bodies, rotation, equilibrium. Optional topics include periodic motion, fluids, heat, and thermodynamics.

Required Texts:

- University Physics by Young and Freedman – 15th Edition.
- Textbook ISBN-13: 9780135159705.
- Mastering Physics is not required for the homework.

Grading Policy:

- The course grade will be based on the following:
- Homework and Quizzes   30%
- Midterm Exams (2)   40%
- Cumulative Final Exam   30%
- A 90%+
- B 80%+
- C 70%+
- D 60%+
- F <60%

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Attendance Policy: Florida Tech policy requires that you attend class. Attendance will be taken each class. If you know that you will miss class, please notify me in advance. I use the "yellow" Canvas option for excused cases, online participants, or for tardiness or leaving early. <u>Attendance is not directly used in computation of your grade.</u> (Some other instructors weight it at 2%.) Failure to keep your attendance level above 75% could result in action by the registrar's office.

Homework: Homework is an important element of the course, and I emphasize it more than most of the other instructors. Feedback will be provided along with the grade, and I will tailor class lectures where there is an obvious need. Late homework is penalized on a pro-rated basis up to 10% if turned in before we go over it in class (usually within a week of the due date.). After that, there is a minimum penalty of 20%.

Unlike some other instructors, I don't drop the lowest grade or grade(s). However, there is good news: there are frequent "extra credit" exercises that will allow many students to have a homework average over 100%. This philosophy allows students to get substantial credit, without the pressure of examinations, and this factor has been popular with students in other classes that I have taught.

I like to allow students to make up points on homework or do extra credit problems, even after the final exam. This gives students near a grade boundary the opportunity to make up a few points and earn a higher grade. However, this is not designed as an avenue to wait and do all the homework at the end of the semester. (Some students have tried this and tend to do poorly on exams.) In addition to the 20% penalty, I will limit any gains to one letter grade. A better approach is to make up obvious things you miss on homework promptly, when penalties are lighter.

First, try problems on your own, but working in small groups is acceptable. However, submitted work must use your own words and explanations. You should be able to explain to me in person how to solve each problem. The best approach is to start early, and pace yourself. Do a little each day. Seek help promptly if you get stuck. Ask questions in class, via email, or at office hours.

Avoid looking at solution manuals or websites with solutions. This tactic often leads to lower quiz and exam scores, which greatly depend on how well you understand the homework. Also, you may get caught. (TurnItIn may not yet be available for this, but there are obvious "tells" like skipping several lines of algebra.) And there are only so many problems. These train your physics intuition for exams. When stuck, it is best to get only enough help to get unstuck.

Some suggestions:

a. Put your first and last name on each page in the upper right-hand corner. This allows stapling in the upper left-hand corner, without blocking your writing. Better yet, leave a margin at the top of each page so that your work (especially problem numbers) does not get stapled together.

b. Try to use standard size (8.5" x 11") paper. Be reasonably neat, and especially, **don't turn in papers with food or drink stains**. It helps to put a box around your answer. It helps to put problems in sequential order, but at least make sure all parts are numbered.

c. **Show all work** – include relevant equations, algebraic steps, numerical input, and units. It helps to include some words that describe what you are doing. Provide all intermediate steps and include units. Giving only the answer is likely to earn only a small token credit. However, answer every problem. Displaying effort often results in substantial partial credit even when the answers are substantially wrong. A blank answer of necessity will get a zero grade.

d. Canvas is set up to allow file entry in case you want to scan your homework.

Midterm and final: The midterms will cover everything discussed in class, homework and reading assignments, but emphasize solving problems such as those on the homework. While the final is cumulative, it will be weighted somewhat towards the later material. Examination questions will be similar to homework questions and involve equations, derivations, and calculations.

Students are allowed an equation sheet on exams. It can be up to one standard size (8.5" x 11") sheet of paper. The usual standard has been: (1) midterm 1, front only; (2) midterm 2, front-and-back; (3) final exam, two pages, front-and-back. **It is your responsibility to prepare your equation sheet and bring it (and a calculator) to the exam.**

Quizzes: Quizzes will be rare – probably no more than 1 or 2 for the semester. They are meant only to gauge: (1) how well you understand key concepts from class and homework assignments; and especially (2) how well you are prepared for the upcoming exams.

Academic Honesty Definitions and Procedures: These are located in the student handbook at
https://www.fit.edu/policies/student-handbook/standards-and-policies/academic-honesty/

Title IX Statement: The university's Title IX policy is available at
https://www.fit.edu/policies/title-ix/

Title IX of the Educational Amendments Act of 1972 is the federal civil rights law that prohibits discrimination based on sex in federally funded education programs and activities. Florida Institute of Technology policy also prohibits discrimination on the basis of sex.

Florida Tech faculty are committed to helping create a safe learning environment for all students that is free from all forms of discrimination and sexual harassment, including sexual assault, domestic violence, and stalking. If you, or someone you know, have experienced or is experiencing any of these behaviors, know that help and support are available.

Florida Tech strongly encourages all members of the community to take action, seek support, and report any incident of sexual harassment or gender discrimination to Grace Gamage, Title IX Coordinator at 321-674-8885 or ggamage@fit.edu.

Please note that as your professor, I am required to report any incidences to the Title IX Coordinator. If you wish to speak to an employee who does not have this reporting responsibility, please contact the Student Counseling Center at 321-674-8050.

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Academic Accommodations: Florida Tech is committed to equal opportunity for persons w/disabilities in the participation of activities operated/sponsored by the university. Therefore, students w/documented disabilities are entitled to reasonable educational accommodations. The Office of Accessibility Resources (OAR) supports students by assisting w/accommodations, providing recommended interventions, and engaging in case management services. It is the student's responsibility to make a request to OAR before any accommodations can be approved/implemented. Also, students with approved accommodations are encouraged to speak w/the course instructor to discuss any arrangements and/or concerns relating to their accommodations for the class. Office of Accessibility Resources (OAR): Phone: 321-674-8285 Email: accesibilityresources@fit.edu Website: https://www.fit.edu/accesibility-resources

Recording Disclosure (Privacy Waiver): This course may be recorded for use by students and/or faculty. Enrolled students are subject to having their images and voices recorded during classroom presentations, remote access learning, online course discussions, and remote office hours/meetings. Course participants should have no expectation of privacy regarding their class participation. Recordings may not be reproduced, shared with those not registered in the courses, or uploaded to other online environments. All recordings will be deleted at the conclusion of the academic term.

Other Policies, Operating Procedures & Helpful Suggestions

1. The attached schedule is approximate, but it is likely that we will spend about one week on each chapter. This is a fast pace, so it is critical to keep up. As I already mentioned, do not wait until the last minute to start the homework assignments.

2. Don't plan on leaving Florida Tech before the Final Exam as these will not be given early. No one may take any quiz or exam early or late. The exam period is not extended for late arrivals. Missing an exam will result in a grade of zero. Exceptions will be made only in the case of university sanctioned absences: (a) death in the family, (b) an automobile (or similar) accident, (c) illness requiring urgent care or hospitalization, or (d) playing on an NCAA athletic team. Visitation slips given out by the University Health Center are NOT considered a valid excuse. The office of the Dean of Students verifies any of these extenuating circumstances.

3. This is a calculus-based course, and some homework and exam questions will use differential and integral calculus, including partial derivatives and surface integrals. Homework and exam questions that require calculus are labeled with "CALC", as a guide. Most of the time, it will only be necessary to use ordinary differentiation or integration.

4. Common courtesy and professional behavior are expected. Avoid use of cell phones during class. Leaving to take a call or texting is also distracting. If a physical condition demands a sudden departure, feel free to leave the room unannounced. Use of computers during class should be restricted to note-taking or other class-related activity.

5. The grade of "I", incomplete, is only given for circumstances beyond the student's control, and presumes that the student's work was satisfactory, and that completion of the remaining work

is reasonably expected to result in a passing grade. Florida Tech policy states that the deadline for finishing an incomplete is the beginning of the seventh week of the following semester.

Topics to Be Discussed and Tested

Chapter 1 - Vectors, Vector Addition and Subtraction, Unit Vectors, Multiplication of Vectors

Chapter 2 - Motion in One Dimension, Velocity, Acceleration, Constant Acceleration, Kinematic Equations

Chapter 3 - Motion in Two Dimensions, Position Vector, Velocity and Acceleration Vectors, Projectile Motion, Introduction to Uniform Circular Motion

Chapter 4 - Forces, Principle of Superposition, Newton's First, Second and Third Laws, Static Equilibrium of Forces

Chapter 5 - Further Applications of Newton's Laws, Dynamics of Uniform Circular Motion, Introduction to Non-Uniform Circular Motion

Chapter 6 – The Dot Product of Vectors, Work, Kinetic Energy, the Work - Kinetic Energy Theorem

Chapter 7 - Potential Energy, Conservation of Total Mechanical Energy, Conservative Forces, Potential Energy Diagrams

Chapter 8 - Momentum, Impulse, Conservation of Momentum in One and Two Dimensions, Center-of-Mass

Chapter 9 - Angular Motion, Angular Velocity, Angular Acceleration, The Vector Cross Product, Equations of Rotational Kinematics, Moment of Inertia, Rotational Kinetic Energy

Chapter 10 - Newton's Second Law Applied to Rotating Rigid Objects, Conservation of Energy Applied to Rotating Rigid Objects, Angular Impulse, Angular Momentum, Conservation of Angular Momentum, Gyroscopes

Chapter 11 – The Vector Cross Product, Torque, Moment/Lever Arms, Rotational Equilibrium

Chapter 12 - Fluids, Density, Buoyancy, Archimedes Principle

Chapter 13 - Newton's Law of Gravitation, Gravitational Potential Energy, Circular Orbits, Kepler's Three Laws

Chapter 14 - Simple Harmonic Motion, Oscillations, Simple Pendulum, Physical Pendulum, Torsional Oscillations, Damped Oscillations, Forced Oscillations, Resonance, Coupled Oscillations, Conservation of Energy in Oscilating Systems

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			SPRING 2023 PHY 1001 SCHEDULE OF EVENTS				
No.	Date	Day	Chapter	No.	Date	Day	Chapter
1	9-Jan	Mon.	Introduction	31	6-Mar	Mon.	8
2	10-Jan	Tues.	1	32	7-Mar	Tues.	8
3	12-Jan	Thurs.	1	33	9-Mar	Thurs.	8
4	13-Jan	Fri.	1	34	10-Mar	Fri.	8
	16-Jan	Mon.	M.L.K. Holiday		13-Mar	Mon.	Spring Break
5	17-Jan	Tues.	2		14-Mar	Tues.	Spring Break
6	19-Jan	Thurs.	2		16-Mar	Thurs.	Spring Break
7	20-Jan	Fri.	2		17-Mar	Fri.	Spring Break
8	23-Jan	Mon.	2	35	20-Mar	Mon.	9
9	24-Jan	Tues.	3	36	21-Mar	Tues.	9
10	26-Jan	Thurs.	3	37	23-Mar	Thurs.	9
11	27-Jan	Fri.	3 & 13	38	24-Mar	Fri.	9
12	30-Jan	Mon.	3	39	27-Mar	Mon.	10
13	31-Jan	Tues.	4	40	28-Mar	Tues.	10
14	2-Feb	Thurs.	4 & Quiz 1	41	30-Mar	Thurs.	10
15	3-Feb	Fri.	4	42	31-Mar	Fri.	10
16	6-Feb	Mon.	4	43	3-Apr	Mon.	Exam Review
17	7-Feb	Tues.	5	44	4-Apr	Tues.	Exam 2
18	9-Feb	Thurs.	5	45	6-Apr	Thurs.	11
19	10-Feb	Fri.	5	46	7-Apr	Fri.	11
20	13-Feb	Mon.	5	47	10-Apr	Mon.	11
21	14-Feb	Tues.	6	48	11-Apr	Tues.	14
22	16-Feb	Thurs.	6	49	13-Apr	Thurs.	14
23	17-Feb	Fri.	6	50	14-Apr	Fri.	14
	20-Feb	Mon.	Pres. Day Holiday	51	17-Apr	Mon.	13
24	21-Feb	Tues.	Exam Review	52	18-Apr	Tues.	13
25	23-Feb	Thurs.	Exam 1	53	20-Apr	Thurs.	13
26	24-Feb	Fri.	6	54	21-Apr	Fri.	Review
27	27-Feb	Mon.	7	55	24-Apr	Mon.	Review
28	28-Feb	Tues.	7 & 13	56	25-Apr	Tues.	Review
29	2-Mar	Thurs.	7		27-Apr	Thurs.	Study Day
30	3-Mar	Fri.	7		28-Apr	Fri.	Study Day
					2-May	Tues.	Final Exam (10:30)