



**PHYS-1410-221CL**  
**Applied Physics**  
**Spring 2024**  
**6:00 pm to 8:50 pm**  
**Tuesday and Thursday**

**Instructor Information:**

**Instructor:** Dr. Rebecca Fagan

**E-mail:** rfagan@com.edu (preferred method of communication)

**Office:** (409)933-8890

**Student hours and location:**

Tuesday, Thursday, and Friday 9:30am to 12:00pm

Or by appointment

Location: STEAM 325-18

**Required Textbook/Materials:**

- Applied Physics Guide, 2nd Edition
- You can download the *“Applied Physics Guide 2nd Edition”* free from [D2L under course materials tab](#).
- If you want a hard copy of the book, you can purchase it from the College Bookstore.
- *“Applied Physics Lab Manual”*, purchased from College Book Store.

**Course Description:**

- (LECTURE 3, LAB 3). CREDIT 4. ACGM
- This is a one-semester, **non-calculus** approach to the principles of force and motion, work and energy, fluids, heat, and thermodynamics.
- The course is intended for students of process technology, other workforce students, and students seeking a foundation for further academic studies.
- The concepts of fluids, heat and thermodynamics are emphasized.
- Prerequisites: TECM-1343 or MATH-1314 with a grade of C or better.
- This is an academic transfer course.

## Course requirements:

### Exams

- There will be **three midterm** exams (non-cumulative) and **a final exam** (cumulative).
- Exams will be given and **TAKEN** in class at COM in room S127.
- Exams questions may consist of conceptual questions and problems that need to be solved.
- A formula sheet will be provided during the exam.
- Midterm exams will last 2 hours, and final exam will last 3 hours.
- There are **NO MAKE-UP Exams**. You **may** be allowed to replace **ONE** missed exam (documentation required, personal/family illness or trauma) with the value of your **LOWEST** exam grade. Any additional missed exams will be issued a **ZERO**. All students are required to take the final exam – NO exemptions. Make every effort to **NOT** miss any exams.

### Laboratory

This course consists of both a lecture and laboratory grade component. Students must earn a 70% or better in the laboratory component to successfully pass the course. Earning less than 70% in the laboratory component will result in an F for the course regardless of the lecture grade. Passing the laboratory component and failing the lecture component will not guarantee a passing grade for the course. Deviations from this policy will be at the sole discretion of the instructor.

- Students are required to perform lab work in the classroom at the COM campus and complete the “Lab Homework” online using **Desire to Learn (D2L)**.
- **Students must pass the lab in order to pass the course.**
- There are no make-up labs due to scheduling problems.
- Lab grading is:
  - Performing the lab in classroom and complete lab manual (**50 %**).
  - Complete Lab HW on D2L (**50%**).
- You **cannot** get a grade for the Lab HW if you do not perform the lab in class.

### Homework Assignment (Online D2L)

- After each chapter, there will be a Homework consisting of 5 to 10 questions.
- Homework will consist of conceptual questions and problems where you need to use some math to solve.
- Homework has deadlines and must be completed in time.
- Homework **is not timed**; however, it **must** be completed before the due date.

### Quiz (Online D2L)

- After each chapter, there will be a Quiz consisting of about 5 to 10 questions.
- Each quiz consists of conceptual questions and questions where you need to use some math to solve.
- Quizzes are **timed**, please complete the quiz once you start doing it.
- Quizzes **must** be completed before the due date.

### Policy on Electronic Devices

- Once students enter the classroom, all electronic devices should be silenced and put away such that they are not visible. These include cell phones, headphones, ear buds, etc. Students may only use electronic devices if authorized by the instructor.

**Methods of Instruction:**

## Lecture

- Power point presentation may be available (PPT will be on D2L)
- Video and/or animation of concepts when suitable
- Solving examples in the book during lecture
- Demonstrations of concepts in class

## Laboratories

- Eleven (11) Labs will be completed on COM campus in S302 (see syllabus for the labs and dates)
- Lab Homework will be done on **D2L**

**Determination of Course Grade/Detailed Grading Formula:**

The details of how each item will be added to your final total are shown in the following chart.

Type of Assessment	% Of the FINAL grade
Three Midterm Exams	10+10+10
Attendance (Sign In sheet)	5
Homework (D2L)	15
Quiz (D2L)	15
Lab (in class) + Lab HW (D2L)	10+10
Final Exam	15
Total	100

Percentage	Letter Grade
90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
0 – 59%	F

### Late Work, Make-Up, and Extra-Credit Policy:

- All assignments must be completed before the due dates. Extension for any assignment may be granted in case of emergencies (**proof must be submitted**).

#### Laboratory

- There are no make-up labs due to scheduling problems.

#### Extra Credit

Class activity: You may get extra credit (points) answering and/or solving questions during the class.

- %5 of extra points earned from class activity will be added to your final grade.
- Maximum extra credit can be earned in one semester from class activity is 5% (5 points) out of 100 points.
- If you earn more than 100 points in a semester you still get a maximum of 5 points.

#### Instructor evaluation

You may get up to **50 points** extra credit as an “instructor evaluation” during the **class to be added to the class activity (towards 100 points)** mentioned above. This will be based on class participation, class interaction, being on time in class etc. Please do not expect this credit, not everyone will get this credit. Please do not ask the instructor to receive this credit at the end of the semester.

### Attendance Policy:

COM recognizes no excused absences other than those prescribed by law: religious holy days and military service <https://www.com.edu/student-services/student-handbook.html>.

- Students are expected to attend all class sessions as listed on the course calendar.
- Attendance will be taken at the beginning of each class.
- IF you do have to miss class, it is your responsibility to obtain notes from a classmate.
- Should you anticipate an absence, you must contact your instructor by email **PRIOR** to the absence.
- Each situation will be evaluated independently.
- You must provide legitimate proof for your absence.

Students are not considered to be actively engaged when missing any part of a class. Points per class will be awarded on the schedule presented:

Attendance	Points per Class
entire class (full points)	3
partial (late or leaving early)	1
absent	0

#### Lecture

You are expected to attend all the lectures.

Attendance is 5% of your total grade.

Missing lectures may affect your overall class performance.

**Laboratories**

Given the hands-on nature of the laboratory, participation in this portion of the course is crucial. A student must successfully complete 75% (9 out of 12 labs) of all laboratory assignments to pass the laboratory portion. Failure to complete 75% of the laboratory assignments may result in a failing laboratory grade and a failing grade for the course. Documented excused absences (i.e., death in the family or a documented illness) will be handled on a case-by-case bases and at the discretion of the instructor.

**Communicating with your instructor:** ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means.

**Student Learner Outcomes:**

Upon successful completion of this course, students will successfully demonstrate mastery of the Student Learner Outcomes listed below.

<b>Student Learner Outcome</b>	<b>Maps to Core Objective</b>	<b>Assessed via this Assignment</b>
1. Demonstrate an understanding of basic Newtonian mechanics for the special case of one-dimensional motion.	Teamwork	Labs 1-4. Students work in teams to achieve the objectives of each lab activity. Instructor will monitor and guide students to ensure that each member of each team is working effectively to achieve those objectives.
2. Demonstrate an understanding of basic work and energy concepts for the special case of one-dimensional motion.	Communication Skills (Written)	Labs 5-6. Students are guided through a written inquiry that requires them to develop, interpret, and express ideas in writing involving the relationships between work and energy. Instructor monitors these activities in real time and reviews the written passages.
3. Demonstrate an understanding of basic fluid properties and heat and temperature concepts.	Empirical and Quantitative Skills	Labs 7-9. Students collect data, make observations and manipulations of that data in an attempt to arrive at an understanding of the relationship between heat and temperature of fluids. Students submit their conclusions in writing and complete a homework assignment.

Student Learner Outcome	Maps to Core Objective	Assessed via this Assignment
4. Demonstrate an understanding of basic thermodynamics concepts.	Critical Thinking Skills	Labs 10-12. Students develop skills through creative thinking and innovation as they develop their ability to analyze, evaluate, and synthesize the information associated with an understanding of the 1st and 2nd laws of thermodynamics. Students submit their written work and complete a homework assignment.

### Academic Dishonesty:

- College of the Mainland is committed to a high standard of academic integrity. In becoming a part of the academic community, students are responsible for honesty and independent effort. Incidents of academic and scholastic dishonesty (including cheating, plagiarism, and collusion) will be dealt with in a manner consistent with College Policy and the Student Handbook.
- Violations may result in a penalty. The maximum penalty will be a grade of "F" for the course. Violations may also be reported to the Judicial Coordinator as instances of *Inappropriate Behavior*. Please see the section on Privileges and Obligations in the Student Handbook for a more complete discussion of *Inappropriate Behavior*, and of your rights and responsibilities.
- There are many situations where you will be required to submit written work to earn points. It is important that the work you submit be your own. You cannot copy the work of another, or have your work copied by another. Doing so will be considered a violation of Academic Honesty.
- The work that you submit must be a product of your own mind. When completing assignments, for example, you are encouraged to collaborate with others to try to come to an understanding. But when you set pen to paper to write your answer, what you write must be a product of your own mind. When identical, or nearly identical, writings are submitted by students, it will lead me to suspect that work was copied. You could then be in violation of the standards of academic honesty, as described above.

### Student Concerns:

If you have any questions or concerns about any aspect of this course, please contact me using the contact information previously provided. If, after discussing your concern with me, you continue to have questions, please contact the department chairperson, Professor Sheena Abernathy, either in person, by telephone at 409-933-8330, or by email at [sabernathy@com.edu](mailto:sabernathy@com.edu).

**Course outline:****Phys-1410-221CL, Applied Physics – Tentative Course Schedule**

Class	Date	Lecture Topic	Laboratories Thursdays
1	Tuesday, January 16	<b>Introduction</b>	—
2	Thursday, January 18	<b>Ch 1: Underpinnings:</b> Ratios, graphs, scientific notation, and significant figures	<b>NO Lab</b> Lecture
3	Tuesday, January 23	<b>Ch 1: Underpinnings:</b> Ratios, graphs, scientific notation, and significant figures	—
4	Thursday, January 25	<b>Ch 2: Position and Velocity:</b> Average velocity, position-time graphs	<b>NO Lab</b> Lecture
5	Tuesday, January 30	<b>Ch 2: Position and Velocity:</b> Average velocity, position-time graphs	—
6	Thursday, February 01	<b>Lab 1</b>	<b>Lab 1: Introduction to Motion</b>
7	Tuesday, February 06	<b>Ch 3: Velocity and Acceleration:</b> Constant acceleration, graphical interpretation of acceleration	—
8	Thursday, February 08	<b>Lab 2</b>	<b>Lab 2: Changing Motion</b>
9	Tuesday, February 13	<b>Exam 1 (Chapter 1-3), in classroom S127</b>	—
10	Thursday, February 15	<b>Ch 4: Force and Motion:</b> Newton's Laws	<b>NO Lab</b> Lecture
11	Tuesday, February 20	<b>Ch 4: Force and Motion:</b> Newton's Laws	—
12	Thursday, February 22	<b>Lab 3</b>	<b>Lab 3: Passive Forces</b>
13	Tuesday, February 27	<b>Ch 5: Work and energy:</b> Work, kinetic energy, potential energy	—
14	Thursday, February 29	<b>Lab 4</b>	<b>Lab 4: Force and Motion</b>
15	Tuesday, March 05	<b>Ch 5: Work and energy:</b> Mechanical energy, internal energy, power	—
16	Thursday, March 07	<b>Lab 5</b>	<b>Lab 5: Work and Energy</b>
<b>Spring Break, March 11 – 17</b>			

Class	Date	Lecture Topic	Laboratories Thursdays
17	Tuesday, March 19	<b>Ch 6: Fluids:</b> Density, pressure, Archimedes, Bernoulli, Pascal's principles	—
18	Thursday, March 21	<b>Lab 6</b>	<b>Lab 6: Conservation of energy</b>
19	Tuesday, March 26	<b>Exam 2 (Chapter 4-6), in classroom S127</b>	—
20	Thursday, March 28	<b>Ch 7: Heat and Temperature:</b> Heat, temperature, specific heat, calorimetry, phase change, thermal expansion.	<b>NO Lab</b> Lecture
21	Tuesday, April 02	<b>Ch 8: Introduction to Thermodynamics:</b> Isochoric, isobaric, isothermal, adiabatic process, First law of thermodynamics	—
22	Thursday, April 04	<b>Lab 7</b>	<b>Lab 7: Introduction of Heat and Temperature</b>
23	Tuesday, April 09	<b>Ch 9: Second Law of Thermodynamics:</b> Heat energy transfer, thermodynamic temperature, entropy, reversibility	—
24	Thursday, April 11	<b>Lab 8</b>	<b>Lab 8: Energy Transfer and Temperature Change</b>
25	Tuesday, April 16	<b>Exam 3 (Chapter 7-9), in classroom S127</b>	—
26	Thursday, April 18	<b>Lab 9</b>	<b>Lab 9: Heat and Energy Transfer</b>
27	Tuesday, April 23	<b>Ch 10: The ideal gas:</b> internal energy, isobaric and adiabatic process for ideal gas	—
28	Thursday, April 25	<b>Lab 10</b>	<b>Lab 10: First Law of Thermodynamics</b>
29	Tuesday, April 30	<b>Ch 11: Heat Engines and refrigerators:</b> Heat engine, efficiency, refrigerator, Carnot engine	—
30	Thursday, May 02	<b>Lab 11</b>	<b>Lab 11: Ideal Gas Law</b>
31	Tuesday, May 07	<b>Final Exam, Ch 1-11 inclusive, in classroom S127</b>	—
—	Thursday, May 09	<b>NO CLASS</b>	—

Changes to this syllabus could be made at the discretion of the instructor and will be announced in class and on **D2L**.



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### Institutional Policies and Guidelines

**Grade Appeal Process:** Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook [https://www.com.edu/student-services/docs/Student\\_Handbook\\_2023-2024\\_v2.pdf](https://www.com.edu/student-services/docs/Student_Handbook_2023-2024_v2.pdf). *An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the student's work and performance is also not an admissible basis for a grade appeal.*

**Academic Success & Support Services:** College of the Mainland is committed to providing students the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

**ADA Statement:** Any student with a documented disability needing academic accommodations is requested to contact Kimberly Lachney at 409-933-8919 or [klachney@com.edu](mailto:klachney@com.edu). The Office of Services for Students with Disabilities is located in the Student Success Center.

**Textbook Purchasing Statement:** A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

**Withdrawal Policy:** Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1<sup>st</sup> 8-week session is February 28. The last date to withdraw from the 16-week session is April 22. The last date to withdraw for the 2<sup>nd</sup> 8-week session is May 1. The last date to withdraw for spring mini session is May 29.

**FN Grading:** The FN grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The FN grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the FN grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an FN grade.

**Early Alert Program:** The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been asked to refer students to the program throughout the semester if they are having difficulty completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer in order for you to meet your academic goals.

#### Resources to Help with Stress:

If you are experiencing stress or anxiety about your daily living needs including food, housing or just feel you could benefit from free resources to help you through a difficult time, please click here <https://www.com.edu/community-resource-center/>. College of the Mainland has partnered with free community resources to help you stay on track with your schoolwork, by addressing life issues that get in the way of doing your best in school. All services are private and confidential. You may also contact the Dean of Students office at [deanofstudents@com.edu](mailto:deanofstudents@com.edu) or [communityresources@com.edu](mailto:communityresources@com.edu).