

Applied Physics (SCIT 1418)



Credit: 4 semester credit hours (3 hours lecture, 2 hours lab)

Prerequisite: MATH 1332

Course Description

Introduction to physics for industrial applications including vectors, motion, mechanics, simple machines, matter, heat, and thermodynamics.

Required Textbook and Materials

1. *Applied Physics* by Dale Ewen, Neill Schurter and P. Erik Gundersen, 11th edition. Pearson Prentice Hall Publishers.
 - a. ISBN-10: 0134159381 or ISBN-13: 9780134159386.
2. Three-ring binder.
3. Tabbed dividers.
4. Scientific (non-graphing) calculator.
5. Pens or pencils.

Course Objectives

Upon completion of this course, the student will be able to:

1. Define the basic terminology as related to applied physics
2. Use appropriate measuring devices to analyze systems
3. Apply the relationships of length, mass, and time
4. Demonstrate problem-solving techniques related to physics principles including: vectors, motion, mechanics, simple machines, matter, heat, and thermodynamics
5. Demonstrate laboratory skills related to physics principles.

Course Outline

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| <p>A. Math for Physics Review</p> <ol style="list-style-type: none">1. Standards of Measure<ol style="list-style-type: none">a. British systemb. Metric system2. Scientific Notation3. Significant figures and Accuracy4. Precision5. Conversions<ol style="list-style-type: none">a. British-Britishb. Metric-Metricc. Metric-British6. Area and Volume7. Calculations with Significant Digits8. Basic Algebraic Calculations9. Problem Solving Method | <p>B. Force and Motion</p> <ol style="list-style-type: none">1. Force2. Newton's Laws of Motion<ol style="list-style-type: none">a. Law of Inertiab. Law of Acceleration<ol style="list-style-type: none">1. Friction2. Gravity and Weight3. Law of Action and Reaction <p>C. Momentum</p> <ol style="list-style-type: none">1. Momentum2. Collisions<ol style="list-style-type: none">a. Elastic Collisionsb. Inelastic Collisions <p>D. Basic Right Triangle Trigonometry</p> <ol style="list-style-type: none">1. Right Triangles |
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SCIT 1418

Course Syllabus

2. Trigonometric Functions
 - a. Sine
 - b. Cosine
 - c. Tangent
3. Using Trigonometric Functions
 - a. Determine an Unknown Side
 - b. Determine an Unknown Angle
- E. Vectors
 1. Vectors and Scalars
 2. Components of a Vector
 3. Addition of Vectors
- F. Concurrent and Parallel Forces
 1. Forces in Two Dimensions
 2. Concurrent Forces in Equilibrium
 3. Torque
 4. Parallel Forces
 5. Center of Gravity
- G. Simple Machines
 1. Machines and Energy Transfer
 2. Lever
 3. Wheel and Axle
 4. Pulley
 5. Inclined Plane
 6. Screw
 7. Wedge
 8. Compound Machines
- H. Transferring Rotational Motion
 1. Gears
 2. Pulleys Connected With a Belt
- I. Matter
 1. Properties of Matter
 2. Properties of Solids
 3. Properties of Liquids
 4. Properties of Gases
 5. Density and Specific Gravity
- J. Fluids
 1. Hydrostatic Pressure
 2. Pascal's Principle
 3. Air Pressure
 4. Buoyancy
 5. Fluid Flow
- K. Temperature and Heat Transfer
 1. Temperature
 2. Heat
 3. Heat Transfer
 4. Specific Heat
 5. Calorimetry
 6. Change of Phase
- L. Gas Laws
 1. Charles' Law
 2. Boyle's Law
 3. Gay-Lussac's Law
 4. Combined Gas Law

Grade Scale

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

Course Evaluation

Final grades will be calculated according to the following criteria:

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| 1. 3 or 4 Unit Tests | 50% |
| 2. Comprehensive Final Exam | 20% |
| 3. Homework, Class Binder | 10% |
| 4. Laboratory | 20% |

Course Requirements

1. Semester binder containing all handouts, homework, tests, and labs.
2. Laboratory projects.
3. Chapter homework.

SCIT 1418

Course Syllabus

4. Unit Tests
5. Comprehensive Final Exam

Course Policies

1. Each unit has assigned homework problems. All homework is due on the testing day for that unit and must be turned in inside a binder containing dividers as assigned by the instructor. All calculations must be shown to receive credit. Completing only odd problems and skipping even problems will result in a grade of ZERO (0).
2. Makeup work, including labs and exams, may only be made up at the instructor's discretion. It is the responsibility of the student to contact the instructor as soon as possible to arrange for makeup work. All makeup work must be completed within one week of the original due date.
3. There is a 20-point penalty for work turned in less than one week late. There is a 50-point penalty for work turned in more than one week late, but less than two weeks late. Work turned in more than two weeks late will not be accepted.
4. Students will not be automatically dropped from the class due to poor attendance or grades. Discontinuing class attendance without properly submitting a drop request will result in a failing grade (F).
5. Students are expected to stay for the full duration of the lab period or until all data is taken, calculations are performed, and the lab assignment is turned in. Reports are to be neat and complete. **DO NOT USE RED INK.** Corrections should be made by a single line through the incorrect data and the correction entered next to the old data. Calculations may be done in pencil, but data should be recorded in ink.
6. Safety rules must be abided by at all times. Any student who continually breaks the safety rules will be removed from the class to insure the safety of the other students in the class.
7. All electronic devices need to be turned off unless prior approval has been given by instructor to have them set to vibrate. (Permission will only be given in emergency situations.)
8. Children are **not allowed** in either the lecture class or laboratory at any time.
9. **No** food, drinks, or use of tobacco products in class.
10. Attendance in class is vital to understanding physics. If an absence is unavoidable, arrange with the instructor to attend another session of the class. If you are absent, it is your responsibility to obtain copies of at least two other student's notes and rewrite them in your notebook. If you need further assistance, please sit up an appointment with the instructor for a tutoring session. Excessive unexcused absences (per instructor's discretion) will result in a ten-point deduction from the final semester grade. Attendance in lab is mandatory. Missed labs may be made up within one week without penalty at the instructor's discretion. Labs not made up within two weeks will result in a grade of zero (0). A lab that is one day to one week late will incur a 20-point penalty. A lab that is more than one week, but less than two weeks late will incur a 50-point penalty. At the end of the semester, three missed labs (grades of 0) will result in an automatic failing grade (F) for the course.

SCIT 1418

Course Syllabus

11. During class time, **all electronic devices need to be turned to silent or off**, unless prior approval has been given by instructor to have them set to vibrate. (Permission will only be given in emergency situations.)
12. **It shall be considered a breach of academic integrity (cheating) to use or possess on your body any of the following devices during any examination unless it is required for that examination and approved by the instructor:**
 - **Cell phone**
 - **smart watch/watch phone**
 - **laptop**
 - **tablet**
 - **electronic communication devices (including optical)**
 - **earphones connected to or used as electronic communication devices.**

1st Offense: The exam will be taken from the student and the student will receive a grade of ZERO (0) for the exam which will be averaged into the student's class average and there will be NO MAKEUP of the test.

2nd Offense: The student will be removed from the class and will receive a grade of FAILING (F) for the entire lecture and lab grade.

Students with special needs and/or medical emergencies or situations should communicate with their instructor regarding individual exceptions/provisions. It is the student's responsibility to communicate such needs to the instructor.

Technical Requirements (for courses using Blackboard)

The latest technical requirements, including hardware, compatible browsers, operating systems, software, Java, etc. can be found online at:

[https://help.blackboard.com/en-](https://help.blackboard.com/en-us/Learn/9.1_2014_04/Student/015_Browser_Support/015_Browser_Support_Policy)

[us/Learn/9.1_2014_04/Student/015_Browser_Support/015_Browser_Support_Policy](https://help.blackboard.com/en-us/Learn/9.1_2014_04/Student/015_Browser_Support/015_Browser_Support_Policy)

A functional broadband internet connection, such as DSL, cable, or WiFi is necessary to maximize the use of the online technology and resources.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

SCIT 1418

Course Syllabus

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the LIT Catalog and Student Handbook. The LIT Catalog and Student Handbook may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office. Please note that the online version of the LIT Catalog and Student Handbook supersedes all other versions of the same document.

Starfish

LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.

