I. INTRODUCTION

A. Fundamental principles of physics, using algebra and trigonometry; the principles and applications of classical mechanics and thermodynamics, including harmonic motion, mechanical waves and sound, physical systems, Newton’s Laws of Motion, and gravitation and other fundamental forces; with emphasis on problem solving.

B. Satisfactory completion of this course earns the student four semester hours credit in college physics required by most colleges of students who plan to major in the natural sciences, chemistry, pre-med or the medical sciences and other majors which require an algebra/trig-based physics course.

C. This course is occupationally related and serves as preparation in the medical school.

D. Prerequisites: MATH 1314 or 1414 College Algebra AND MATH 1316 Plane Trigonometry or MATH 2312 or 2412 Pre-Calculus.

II. LEARNING OUTCOMES

Upon successful completion of this course, College Physics I, the student will be able to:

A. Determine the components of linear motion (displacement, velocity, and acceleration), especially motion under conditions of constant acceleration.

B. Apply Newton’s laws to physical problems including gravity.

C. Solve problems using principles of energy.

D. Use principles of impulse and linear momentum to solve problems.

E. Solve problems in rotational kinematics and dynamics, including the determination of the location of the center of mass and center of rotation for rigid...
bodies in motion.

F. Solve problems involving rotational and linear motion.

G. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.

H. Demonstrate an understanding of equilibrium, including the different types of equilibrium.

I. Discuss simple harmonic motion and its application to quantitative problems or qualitative questions.

J. Solve problems using the principles of heat and thermodynamics.

K. Solve basic fluid mechanics problems.

III. INSTRUCTIONAL MATERIALS

The instructional materials identified for this course are viewable through www.ctcd.edu/books.

IV. COURSE REQUIREMENTS

A. Reading Assignment:
Specific topics from the textbook will be included in the course outline (Section VIII). Students should read the assigned material for each assigned topic, take notes during the lecture, read the chapter a second time and rewrite notes during this second reading in a way that makes the greatest amount of sense to the student as well as make drawings, if necessary, and critically examine the course material repetitiously multiple days in advance of the exam.

B. Requirements:
Students may want to record the lectures to help master the material. Students will need to provide written answers to end of chapter questions. Students will answer multiple choice questions that are derived from the end of chapter questions. A quiz will be taken at the beginning of class time that will be derived from the aforementioned multiple choice questions. A rule of thumb is to spend 3 hours of study time for every 1 hour of class time.

C. Class Performance:
Students are expected to attend lecture and lab during their scheduled time. If for any reason a student cannot or decides not to complete the course, then it is the responsibility of the student to withdraw from the course prior to the withdrawal date. The Instructor will not withdraw/drop a student from the course.
at any time. If a student ceases to attend class and does not withdraw from the course, then an appropriate course grade will be submitted at the end of the semester.

If you must be absent from any class meeting, it is your responsibility to find out what happened in class while you were gone. Make friends with one or more other students in class so that you can ask them what happened and secure any assignments which were given during your absence. Absenteeism is no excuse for not being ready for the current class.

This course, like most science courses, builds on itself. Concepts presented at the beginning of the course will be expanded on and provide the foundation for later material. If you do poorly on any exam, it is important that you go back over the material to be sure that you understand it.

V. EXAMINATIONS

There will be four unit exams given at the times announced. Lowest unit exam score will be dropped. Missed unit exams will not be made up under any circumstances. There will also be a mandatory comprehensive final exam. The final exam cannot be missed – doing so will earn an “F” in the course.

VI. SEMESTER GRADE COMPUTATIONS

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<td>Homework</td>
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VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM COURSE INSTRUCTOR

A. **Withdrawal from the course:** It is the student’s responsibility to officially drop/withdraw from a class if circumstances prevent attendance or if the student decides not to continue with the course and this must be done before the withdrawal date. An instructor cannot initiate a withdrawal based on the student’s request. All students who desire to or must officially withdraw from a course on or after the first scheduled class meeting must file an Application for Withdrawal with the local CTC representative by the last date to withdraw. Students enrolled in distance learning courses and who do not have access to a local CTC representative should submit a withdrawal form to EaglesOnCall@ctcd.edu or the CTC Records Office in Killeen, Texas.

*Applications for Withdrawal will be accepted at any time before the completion
of the 12th week of classes for 16-week courses, the sixth week of classes for eight-week courses, or the fourth week of classes for six-week courses.

*For non-GoArmyEd active military students, the effective date of withdrawal is the filing date with the Education Center. For all other students, the effective date of withdrawal is the date that the withdrawal application is received by the Central Texas College representative.

*Students who used financial aid, military tuition assistance, VA benefits, or other non-personal funds may be required to repay tuition and fees to the funding agency. For specific repayment requirements, contact the Office of Student Financial Aid or Veterans Services Office before withdrawing. Military tuition assistance students should visit their military Education Center or Navy College Office.

*Students may not withdraw from a class for which the instructor has previously issued a grade of “F.”

B. **An Administrative Withdrawal:** Administrative Withdrawal: A student may be administratively withdrawn by a designated member of the administrative staff of the College under the following conditions:

- The student has been placed on Academic Suspension or Disciplinary Suspension;
- The student has an outstanding financial obligation owed to the college; or
- The student registered for a course without the required prerequisite or departmental permission.

The college is under no obligation to refund tuition and fees, or other costs associated with a student who is administratively withdrawn.

C. **An Incomplete Grade:** Incomplete, Course in Progress (for non-developmental courses): An “IP” grade may be assigned by an instructor if a student has made satisfactory progress in a course with the exception of a major quiz, final exam, or other project. The “IP” grade may also be assigned for extenuating circumstances beyond a student’s control such as personal illness, death in the immediate family, military orders, or in the case of distance learning courses, institutional technology failures and mail delays. Notice of absences with supporting documentation may be required by the instructor. The instructor makes the final decision concerning the granting of the incomplete grade. The instructor may set a deadline for completing the remaining course requirements. In no case will the deadline exceed 110 days after the scheduled end of the course. An “IP” grade cannot be replaced by the grade of “W.” If a student elects to repeat the course, the student must register, pay full tuition and fees and repeat the entire course. At the end of the 110 calendar days if the student has not completed the remaining coursework as required by the instructor, the “IP” will be converted to an “FI” and appear as an “F” on the student’s official transcript. A student who merely fails to show for the final examination will receive a zero for the final and a “F” for the course.
D. **Cellular Phones:** Cell phones will be turned off while the student is in the classroom or laboratory. Use of a cell phone during an exam or quiz will result in a zero for that work. If a student, in any way, makes a copy of exam questions, homework or quiz questions – then that student will be dropped from the course with an “F”. The number for your family members to call in an emergency is 254-526-1200.

E. **Americans with Disabilities:** Disability Support Services (DSS) provides support services for students who have appropriate documentation of a disability. Students requiring classroom, academic or other accommodations are responsible for contacting DSS located on the central campus, Building 111, Room 207, (254) 526-1291. This service is available to all students, regardless of location. Reasonable accommodations will be given through DSS in accordance with American with Disabilities Act (ADA) and Section 504 Rehabilitation Act. Additional information from DSS is available at [http://www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support).

F. **Instructor Discretion:** The instructor reserves the right of final decision in course requirements.

G. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

H. For complete information consult the College Catalog.

**VIII. COURSE OUTLINE**

A. **Motion, Kinematics in One Dimension**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   
a. Discuss motion in one dimension.
b. Describe coordinate system.
c. Distinguish between vectors and scalars.
d. Convert units of measurement.
e. Solve problems regarding speed and acceleration.
f. Explain physics of falling bodies.

B. **Kinematics in Two or Three Dimensions**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student
will:
   a. Identify motion in two and three dimensions.
   b. Perform addition, subtraction and multiplication of vectors.
   c. Describe projectile motion and solving problems in projectile motion.

C. **Motion and Force—Dynamics**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   b. Solve problems with Newton's Laws and involving friction, inclines.
   c. Explain the force of gravity.

D. **Circular Motion and Gravitation**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain circular motion.
   b. Describe Newton's law of universal gravitation.
   c. Discuss the four fundamental forces of nature.

E. **Work and Energy**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Define work.
   b. Describe work done by a constant force.
   c. Discuss work-energy theorem.
   d. Define kinetic and potential energy.
   e. Describe the law of conservation of energy.
   f. Define power.

F. **Linear Momentum**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Discuss the relation between momentum and force.
   b. Describe the Laws of Conservation of Linear momentum.
   c. Distinguish different types of collisions.
   d. Define center of mass in general motion.
G. **Rotational Motion**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain the concept of rigid body rotation.
   b. Define angular velocity and angular acceleration.
   c. Explain uniformly accelerated motion.
   d. Apply the definition of torque to solve problems.
   e. Discuss rotational kinetic energy.

H. **Bodies in Equilibrium**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain the conditions for static equilibrium.
   b. Solve problems in static.
   c. Define stress and strain.
   d. Explain the meaning of fracture.

I. **Fluids**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Define the phases of matter.
   b. Explain density and specific gravity.
   c. Discuss unit of pressure in fluids.
   d. Explain buoyancy.

J. **Vibration and Waves**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain simple harmonic motion.
   b. Discuss the physics of a simple pendulum.
   c. Explain wave motion.
   d. Define node, antinode in a standing wave.

K. **Sound**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain the characteristics of sound.
   b. Describe the sources of sound.
c. Explain Doppler Effect.

L. **Temperature and Kinetic Theory**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain the constituents of matter and atom.
   b. Explain temperature and its various units.
   c. Discuss the thermal properties of matter.
   d. Describe the ideal gas laws.

M. **Heat**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain the meaning of heat.
   b. Distinguish between temperature and heat.
   c. Explain the physics of heat transfer.

N. **Thermodynamics**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:
   a. Explain the laws of thermodynamics.
   b. Explain the method of heat engines and refrigeration.
   c. Describe the concept of entropy.
   d. Discuss thermal pollution.

O. **Relativity**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:
   a. Describe relative motion and reference frame.
   b. Define the postulates of special theory of relativity.
   c. Explain four-dimensional space-time.
   d. Describe time dilation and length contraction.
   e. Discuss Relativistic energy
   f. Apply and define the following terms:
      - Frame of Reference, Postulates of Relativity, Simultaneity, Time Dilation, The Twin-Paradox, Length contraction