

PHYS 2CM: GENERAL PHYSICS: CALCULUS SUPPLEMENT

Foothill College Course Outline of Record

Heading	Value
Units:	1
Hours:	1 lecture per week (12 total per quarter)
Prerequisite:	MATH 1B or 1BH.
Corequisite:	Completion of or concurrent enrollment in PHYS 2C.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU/UC
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Student Learning Outcomes

- The student will be able to solve problems in Modern Physics involving calculus.
- The student will be able to interpret phenomena in Waves and Optics with a calculus treatment.

Description

Application of calculus to physics topics and problems in thermodynamics, waves, optics and modern physics.

Course Objectives

The student will be able to:

- Solve problems in Thermodynamics involving calculus.
- Interpret phenomena in Waves and Optics with a calculus treatment.
- Solve problems in Modern Physics involving calculus.

Course Content

- Solve problems in Thermodynamics involving calculus
 - Work in Thermodynamics
 - Area Under the Curve
 - Isotherms
 - Adiabatic Processes
 - Definition
 - Relationship between Temperature and Pressure
 - Conserved Quantities and Work Done
 - Entropy Using Integrals
 - Definition
 - Entropy in Temperature Change
 - Entropy in Free Expansion of Gas
 - Entropy of Mixing
 - Speeds and the Maxwell-Boltzmann Velocity Distribution
- Interpret phenomena in Waves and Optics with a calculus treatment
 - The Wave Equation
 - Definition/Solution
 - Speed
 - Energy Transport

- Snell's Law as a Minimization Problem
- Rainbows
 - Refraction by Raindrops
 - Minimization Leading to the Rainbow
- Solve problems in Modern Physics involving calculus
 - Radioactivity
 - Differential Equation
 - Exponential Decay and Half-lives
 - Schrodinger's Equation - Particle in a Box
 - The Time-Independent Equation
 - Conditions that Define a Particle in a Box
 - Solutions
 - Schrodinger's Equation - Probabilities
 - Probabilistic Interpretation of Quantum Mechanics
 - How to Use Coefficients to Generate Probabilities

Lab Content

Not applicable.

Special Facilities and/or Equipment

None.

Method(s) of Evaluation

- Weekly assignments
- Midterms
- Final examination

Method(s) of Instruction

Lecture, Demonstration

Representative Text(s) and Other Materials

Instructor-generated materials. Text at the level of Halliday and Resnick optional.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- Homework problems covering subject matter from text and related material ranging from 3-10 problems per week. Students will need to employ critical thinking in order to complete assignments.
- One hour per week of lecture covering subject matter from text and related material. Reading and study of the textbook, related materials and notes.

Discipline(s)

Physics/Astronomy