# Physics 190 Section 5749
## Mechanics and Thermodynamics
## Cuyamaca College

**Spring 2019**

**Instructor: Jerry Riley**

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**Office Hours: M and W from 7:30 to 8:00 AM in room H223**

**Description:**

**190 MECHANICS AND HEAT 5 UNITS**

***C-ID PHYS 205, C-ID PHYS 200S***

4 hours lecture, 3 hours laboratory

This course covers linear and rotational kinematics and dynamics, equilibrium, work, energy, momentum, gravitation, simple harmonic motion, thermal properties of matter, and thermodynamics. This course is the first of a three-semester sequence intended for students majoring in a physical science or engineering. *AA/AS GE, CSU, CSU GE, IGETC, UC credit limit*

The Physics 190, 200 and 210 sequence satisfies the lower division physics requirement for astronomy, chemistry, engineering, physics and pre-med majors.

**Course Prerequisites:**

Prerequisite: "C" grade or higher or "Pass" in MATH 180 or equivalent or concurrent enrollment

**(Recommended Preparation: Concurrent enrollment in MATH 280)**

**WITHOUT THE FOLLOWING SKILLS, COMPETENCIES AND/OR KNOWLEDGE, YOU WILL BE HIGHLY UNLIKELY TO SUCCEED IN THIS COURSE:**

Ability to solve algebraic word problems by using substitution or simultaneous equations
Knowledge of trigonometric functions and their identities
Ability to solve linear, quadratic and trigonometric equations

**Student Learning Outcomes**

Upon completion of this course, students will be able to:

1) Solve problems using a conceptual understanding of kinematics.
2) Solve problems using a conceptual understanding of dynamics with linear or rotational applications.

3) Apply energy and momentum techniques to analyze systems.
4) Understand the concepts of heat, thermodynamics, and ideal gases and be able to use them in solving problems involving thermal equilibrium, heat transfer or heat engines.
5) Collect and analyze experimental data using graphical representation, including appropriate use of units and significant figures.
6) Relate the results of experimental data to the physical concepts discussed in the lecture portion of the class.

**Course Objectives**

Students will be able to:

1) Recognize the basic concepts concerning kinematics, dynamics, energy, momentum, gravitation, oscillations and thermodynamics, and use algebraic, trigonometric and advanced calculus expressions to represent physical situations involving these subjects.
2) Investigate and delineate the relationship between the theoretical principles of physics and their practical applications, and explain how this relationship affects real world problem solving.
3) Investigate, interpret and analyze the fundamental principles of physics based on reading assignments and in-class discussions.
4) Calculate solutions to physics problems using the fundamental principles of physics and symbolic logic skills.
   a. Predict the future trajectory of an object moving in two dimensions with uniform acceleration.
   b. Analyze a physical situation with multiple constant forces acting on a point mass using Newtonian mechanics.
   c. Analyze a physical situation with multiple forces acting on a point mass or extended object using concepts of work and energy.

During the lab students will:

5) Design experiments using the scientific method.
6) Collect and analyze data using both traditional and computer data acquisition methods; interpret and analyze numerical data, including appropriate use of error propagation, units and significant figures, and generate a visual representation of the data.
7) Evaluate and interpret the experimental results using concepts covered in class.

**Text:**

Sears and Zemansky's: University Physics with Modern Physics, 14th Ed
by Young and Freedman

**Special Materials Required of Student**

Scientific calculator

**Grading:**

80 % 5 Exams (Drop the lowest one) **There are no make-up exams!**
20 % Lab Work

**Grade Cut Offs**

A 90 % to 100 %

B 80 % to 89.99... %
C 60 % to 79.99... %
D 50 % to 59.99... %
F 0 % to 49.99... %

**Tentative Outline**

Chap 1 Units, Physical Quantities and Vectors
Chap 2 Motion Along a Straight Line
Chap 3 Motion in Two or Three Dimensions

**Exam 1**

Chap 4 Newton's Laws of Motion
Chap 5 Applying Newton's Laws
Chap 6 Work and Energy
Chap 7 Potential Energy and Energy Conservation

**Exam 2**

Chap 8 Momentum, Impluse and Collisions
Chap 9 Rotation of a Rigid Body
Chap 10 Dynamics of Rotational Motion

**Exam 3**

Chap 11 Equilibrium and Elasticity
Chap 13 Gravitation
Chap 14 Periodic Motion

**Exam 4**

Chap 17 Temperature and Heat
Chap 18 Thermal Properties of Matter
Chap 19 The First Law of Thermodynamics
Chap 20 The Second Law of Thermodynamics

**Exam 5**

**Tentative Schedule**

| Week | | Mon | Wed |
|---|---|---|---|
| 1 | Jan | 28<br>C 1 | 30<br>C 2 |
| 2 | Feb | 4<br>C 2 | 6<br>C 2 |
| 3 | | 11<br>C 3 | 13<br>C 3 |
| 4 | | 18 | 20 |

| | | | |
|---|---|---|---|
| | | | C 4 |
| 5 | | 25<br>C 5 EX 1 | 27<br>C 5 |
| 6 | Mar | 4<br>C 6 | 6<br>C 6 |
| 7 | | 11<br>C 7 | 13<br>C 8 |
| 8 | | 18<br>C 8 EX 2 | 20<br>C 9 |
| | | 25 | 27 |
| 9 | | 1<br>C 9 | 3<br>C 10 |
| 10 | Apr | 8<br>C 10 | 10<br>C 11 |
| 11 | | 15<br>C 13 EX 3 | 17<br>C 13 |
| 12 | | 22<br>C 14 | 24<br>C 14 |
| 13 | | 29<br>C 17 | 1<br>C 17 |
| 14 | | 6<br>C 18 EX 4 | 8<br>C 18 |
| 15 | May | 13<br>C 18 | 15<br>C 19 |
| 16 | | 20<br>C 19 | 22<br>C 20 |
| | | 27 | 29<br>8:00 – 9:30 |
| | | | |

I reserve the right to make changes to the syllabus and/or schedule in order to optimize progress of the class.

This course adheres to the policies outlined in the Cuyamaca College catalogue. For further information, see Academic Policies stated in the catalogue.

I recommend you use the Supervised Tutoring services that are available to you. Refer to the class schedule for more information. Also, forming study groups has proven to be useful.

I strongly recommend regular attendance because history indicates a strong correlation between grades and attendance. Students who attend class irregularly tend to fail this class.

# Spring 2019 Academic Calendar

| | |
|---|---|
| Application Deadline (for appointment time) | October 26 |
| Registration | November 13 - January 25 |
| Intersession 2019 | January 2 - 26 |
| Last Day to Pay for Registration | Refer to Class Schedule |
| **Holiday (Martin Luther King Day)** | **January 21*** |
| Professional Development - Organizational Meetings | January 22 - 25 |
| **Regular Day & Evening Classes Begin** | **January 28** |
| Program Adjustment | January 28 - February 8 |
| Last Day to Drop without "W" (semester length classes) | February 8 |
| Last Day to Apply for Refund (semester length classes) | February 8 |
| Census Day (semester length classes) | February 11 |
| **Holiday (Lincoln's Birthday Observed)** | **February 15 & 16*(Friday & Saturday)** |
| **Holiday (Washington's Birthday Observed)** | **February 18*** |
| Last Day to Apply for P/NP (semester length classes) | March 1 |
| Last Day to Apply for Spring 2019 Degree/Certificate | March 8 |
| End of First 8-Week Session | March 23 |
| **Spring Recess** | **March 25 - March 30** |
| **Spring Holiday** | **March 29 & March 30*(Friday & Saturday)** |
| Second 8 - Week Session Begins | April 1 |
| Last Day to Drop Semester Length Classes | April 26 |
| End of Second 8-Week Session | May 25 |
| **Holiday (Memorial Day)** | **May 27*** |
| Final Examinations | May 28 - June 3 |
| Spring Semester Ends | June 3 |
| Grossmont Commencement | June 5 (Wednesday) |

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|---|---|
| Cuyamaca Commencement | June 6 (Thursday) |
| **Instructor Grade Deadline** | **June 6** |
| **Summer 2019** | **June 10 - August 1** |

* College and District Offices Closed

For important information regarding course repetition and withdrawal, please click on the link for Admission and Records Important News
Please go to WebAdvisor in order to complete your mandatory online orientation, schedule your english and math placement exams, and select your courses.

## DSPS Main Office

One Stop Center, Room A-113
900 Rancho San Diego Parkway
El Cajon, CA 92019-4369
Phone: 619-660-4239
Fax: 619-660-4055
TTY: 619-660-4386

## DSPS Mission

Disabled Students Programs and Services (DSPS) seeks to increase opportunities for access, success, and inclusive learning environments to students with disabilities so they may participate fully and equitably in college programs and campus life.

## DSPS Hours: Fall 2018

| Day | Open | Close |
|---|---|---|
| Monday | 8:00 am | 6:00 pm |
| Tuesday | 8:00 am | 5:00 pm |
| Wednesdy | 8:00 am | 5:00 pm |
| Thursday | 8:00 am | 5:00 pm |
| Friday | 9:00 am | 1:00 pm |
| Saturday | Closed | |

Sunday Closed

## Other Information

For general counseling questions or questions that may need immediate answers and a DSPS counselor is not available, please use the Online Counseling Services "Ask a Counselor".

For assistance with registering for classes please check out the online WebAdvisor Tutorial. There is also an Arabic Version.

** ***Note:*** Cuyamaca College DSPS does not guarantee the accuracy of translated texts through Google Translate. If the information is not clear, please call for assistance. Cuyamaca College DSPS will not accept any liability for problems caused by the use of the Google Translate feature.

## Problems or Concerns

There are established procedures for resolving complaints from not only prospective and current students, but also community members. For example, as a standard practice, the first step should be to seek a resolution at the local level with the appropriate department. If the complainant does not feel that the issue has been solved at this level to his or her satisfaction, the complainant is able to pursue the matter through the established chain of command. The process must be clearly stated and in compliance with Federal regulation (HEA Title IV, CFR, Sections 600.9 and 668.4 (3) (b) since all Title IV eligible institutions must not only have, but also state its administered complaint process. For more information please follow the link provided below:

https://www.cuyamaca.edu/campus-life/student-affairs/complaintprocess.aspx