Instructor: Dr. Alexander Dzyubenko
Office: Science III, Room 302
Office Hours: Mo We 3:00–4:00 PM  Tu 1:30–3:30 PM  Tr 1:00–2:00 PM
Telephone: 654-2096
EMAIL address: adzyubenko@csub.edu
URL: http://www.csub.edu/~adzyubenko
Lecture: Mo We 12:45PM – 2:50PM  BDC 401D

Lab Sections: Science II 285
Mo 10:00 AM – 12:30PM  Dr. Galina Dzyubenko  gdzyubenko@csub.edu
Tu 3:30PM – 6:00PM  Dr. Alexander Dzyubenko  adzyubenko@csub.edu
Tu 6:00PM – 8:30PM  Dr. Adam Herrera  aherrera@csub.edu

Office Hours: TBA


Goals of this course: Very generally, we will try to address the following goals:
1. To acquire rather detailed qualitative understanding of classical mechanics and its
basic notions and concepts. We will extensively discuss such physical notions and
quantities as velocity and acceleration, mass, inertia and moment of inertia, forces,
linear and rotational motions, Newton’s laws of motion, and mechanical work and
energy. An emphasis on their interrelations will be made.
2. We will be using math extensively for a description of the physical world. The main
goals here are to develop mathematical skills, analytical methods and effective problem
solving skills. An emphasis on using the powerful machinery of calculus will be made.
3. To enhance both written and oral communication skills appropriate to physics.

A rough schedule appears below. Lectures will cover only selected topics from the text but
you will be responsible for all corresponding text material unless specifically told otherwise.

MECHANICS (Ch. 1-13)
Part I: Chapters 1–5  Week 1 – 4  Mar 28 – Apr 20

Ch 1. Physics and Measurement
• Standards of Length, Mass, and Time
• Dimensional Analysis
• Estimates and Order-of-Magnitudes
• Conversion of Units

Ch 2. Motion in One Dimension
• Position, Velocity, Speed, Acceleration
• Motion Diagrams
• Freely Falling Objects

Ch 3. Vectors
• Vectors and Scalars
• Components of Vectors and Unit Vectors
Ch 4. Motion in Two Dimensions
• Projectile Motion
• Circular Motion
• Tangential and Radial Acceleration

Ch 5. The Laws of Motion
• The Concept of Force
• Newton’s Laws of Motion and their applications

Part II: Chapters 6–9: Week 5 – 7 Apr 25 – May 11

Ch 6. Circular Motion and Other Applications of Newton’s Laws
• Second Newton’s Law Applied to Circular Motion
• Motion in the Presence of Resistive Force

Ch 7. Energy of a System
• Work Done by Constant and Varying Forces
• Work-Energy Theorem

Ch 8. Conservation of Energy
• Conservative and Non-Conservative Forces
• Changes in Mechanical Energy

Ch 9. Linear Momentum and Collisions
• Impulse and Momentum
• The Center of Mass
• Rocket Propulsion

Part III: Chapters 10–12: Week 8 – 10 May 16 – June 6

Ch 10. Rotation of a Rigid Object
• Angular and Linear Quantities
• Moment of Inertia and Torque
• Rotational Kinetic Energy

Ch 11. Angular Momentum
• The Product and Torque
• Conservation of Angular Momentum

Ch 12. Static Equilibrium
• The Conditions for Equilibrium

Exam Schedule (Tentative)
April 20, Wednesday First Exam: Chapters 1-5
May 11, Wednesday Second Exam: Chapters 6-9
June 8, Wednesday Third and Final Exam: 2:00 PM - 4:30 PM

Dates to remember:
April 18: Last day to withdraw without a "W" being recorded.
May 16: Last day to withdraw for a serious and compelling reason.
May 30: Holiday, Campus closed, No lecture, No Lab meeting
June 6: Last day of classes

Laboratories

There will be no extensive writeups required for the laboratories but each of you will have to submit a one-page report with the collected data, your calculations, and answered questions. In addition, you will be asked questions about the laboratory exercises on the quizzes and exams. The lab instructions will be posted on the course webpage.
Lab schedule (tentative)

Lab: Handouts will be posted on the class website. The students have to print them out and come to the Lab session prepared. Experiments will be performed in teams. But every student must write a one-page report with the collected data, your calculations, and answered questions. The due date for the reports will be given in class. The use of a word processor and (if applicable) a graphing program is required.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Lab Title</th>
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<tbody>
<tr>
<td>Week 1 Mar 28, Mar 29</td>
<td>Lab 1: Instantaneous vs Average Velocity</td>
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<td>Week 2 Apr 4, Apr 5</td>
<td>Lab 2: Acceleration due gravity</td>
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<td>Week 3 Apr 11, Apr 12</td>
<td>Lab 3: Projectile motion</td>
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<td>Week 4 Apr 18, Apr 19</td>
<td><strong>Problem Solving Session</strong> (Exam 1: Apr 20)</td>
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<td>Week 5 Apr 25, Apr 26</td>
<td>Lab 4: Collisions: Conservation of Momentum</td>
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<td>Week 6 May 2, May 3</td>
<td>Lab 5: Collisions: Conservation of Energy</td>
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<tr>
<td>Week 7 May 9, May 10</td>
<td><strong>Problem Solving Session</strong> (Exam 2: May 11)</td>
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<td>Week 8 May 16, May 17</td>
<td>Lab 6: Force of Friction</td>
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<td>Week 9 May 23, May 24</td>
<td>Lab 7: Rotational Motion</td>
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<tr>
<td>Week 10 May 31, June 6</td>
<td><strong>Problem Solving Session</strong></td>
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<tr>
<td>June 06 (Monday)</td>
<td>Last Day of Classes</td>
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Quizzes

A short quiz will be given once every other week and will consist of a series of short answer/multiple choice questions which will make sure that you keep up with the lecture, lab, and problem sets. Dates will be announced later.

Exams

By far, the most important determinant of your grade is exam performance. The exams are heavily biased toward the homework problems but some conceptual questions will be asked, especially pertaining to the lab exercises. So, if you do your homework conscientiously and attend each class and lab session well prepared, you will perform well, gradewise. For each exam, you will be provided with a “cheat sheet” that includes all of the pertinent equations and constants; so, you won’t be expected to memorize much.

Homework Problems

Problem solving is the key to mastering physics. In fact, if you master all of the questions and problems at the end of each chapter, you will do very well in the course. On regular basis, I will assign some representative problems. The WebAssign® online homework and grading system [http://www.webassign.net/](http://www.webassign.net/) will be used in this course.

Some but not most of these questions will be discussed in detail in problem solving sessions held during a week prior to exams. I encourage you to be proactive in class discussions.

You are requested to register and pay the registration fee at [http://www.webassign.net/user_support/student/](http://www.webassign.net/user_support/student/).
The class key to register is: **csub 9898 9552** (Spring 2016)

Further details and the assignments will be given later.
**Grade Distribution**

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<tbody>
<tr>
<td>Three Exams</td>
<td>60%</td>
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<tr>
<td>Quizzes</td>
<td>20%</td>
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<tr>
<td>Homework:</td>
<td>10%</td>
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<tr>
<td>Labs</td>
<td>10%</td>
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**About grade assignments.** Ultimately, the final grade I assign to you is my judgment of your performance (and only your performance). Inevitably, this judgment contains some subjective component, regardless of how objective I try to be. At the end of the course I will discuss only the bookkeeping related to a person’s grade, but not my assignment of a letter grade. For example, if a student's final score is 79%, I will review at his/her request how I arrived at that number, but I WILL NOT argue with the student why I think that should be a letter grade as opposed to some other letter grade. I will be the judge – NOT THE STUDENT – of what 79% means in the context of the class. Also, any inquiries regarding grades must be made by email.

*The California Faculty Association (CFA) is in the midst of a difficult contract dispute with management. It is possible that the faculty union will call a strike or other work stoppage during this term. I will inform the class as soon as possible of any disruption to the posted schedule.*

*By staying in the class, the student agrees to the terms in this syllabus.*