PHYSICS 2A: General Physics (#75503)

Fall 2009

CALIFORNIA STATE UNIVERSITY, FRESNO
Department of Physics

Course No: Phys 2A (#75503)   **Unit Value: 4 (3 lecture hour and 3 hours of lab)**

Instructor: Daqing Zhang   **Office:** McLane 260

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Class Hours: 8:00—8:45am MWF   **Class Room:** McLane 162

Office Hours: 2:00—3:00pm MW, 9:00—11:00am T, 1:00—2:00pm Thu or by appointment

Grading: Letter (A, B, C, D, F)
Class Website: http://www.blackboard.csufresno.edu/

G.E.: Phys 2A is a G. E. Breadth B1 course. The goal for Area B1: *To understand and actively explore fundamental principles in the Physical Sciences and the methods of developing and testing hypotheses used in the analysis of the physical universe.*

Prerequisite:
> **Math 75:** (functions, graphs, limits, continuity, derivatives and applications),
> **or DS 71**(Quantitative formulation and solution of problems in various disciplines, including mathematics of finance, linear programming, probability, and differential calculus)
> **or permission to register from department office**

What you need to purchase for this course:
- **Textbook: College Physics, REASONING AND RELATIONASHIPS**
  Volume 1, Author: *Nicholas J. Giordano,* available at Kennel Bookstore
- **Web Assign Access Code** for doing and submitting online homework assignments, available at Kennel Bookstore (free with purchasing a new textbook) or   http://www.webassign.net
- **i-clicker** for answering in class quizzes, available at Kennel Bookstore
- **Scantron Form 882-E or ES** for each midterm test and final exam, available at Kennel Bookstore

Course Description:
> This course introduces students the fundamentals of classical Newtonian mechanics, fluid, wave and sound, and thermodynamics. You will learn the concepts and principles of linear and rotational motion, forces, mechanical work and energy, collision and momentum conservation. You will also learn temperature, phase changes, thermodynamic processes and their applications. If time allowed, the class will end up with fluid statics and mechanical waves.

Course Goals:
> The primary goals of this course for students are to understand the basic ideas and principles behind classical Newtonian mechanical, thermodynamic, fluid, and mechanical wave phenomena; to practice their logic and reasoning skills by applying their knowledge of physics and mathematics to physical situation (problem-solving).

Primary Learning Outcomes:

This course is designed for non-science major undergraduate students to learn some of the most important areas in classical physics: Newtonian mechanics, thermodynamics, and fluid statics and mechanical waves. Through the course lectures, demo observation, hands-on experimental labs, and problem-solving practice and discussion,

1. Students will be able to describe objects' motions with position, velocity, acceleration, and mechanical energy.
2. Students will be able to analyze objects' mechanical motions and forces by using Newton's three laws.
3. Students will be able to analyze objects' linear and circular motions by using kinematic equations.
4. Students will be able to solve mechanical problems using Newton's 2nd law, kinematic equations, momentum and mechanical energy conservations.
5. Students will be able to apply Newtonian mechanics on contemporary issues such as planet rotation, satellite launching, skydiving.
6. Students will be able to analyze arbitrary thermodynamic systems using zeroth, 1st, and 2nd thermodynamic laws.
7. Students will be able to solve problems using thermodynamic principles such as basic thermodynamic properties, concepts of temperature, heat, work, and energy, thermal states and processes.
8. Students will be able to discuss practical thermodynamic systems and devices such as air conditioner, automobile engine, and thermo-electric converter and solve such problems using thermodynamic knowledge.
9. Students will be able to solve fluid problems by using Pascal and Archimedes's principles, and Bernoulli's equation.
10. Students will be able to explain wave and sound phenomena with basic concepts such as period, frequency, speed and superposition.

Study Expectations:

It is usually expected that students will spend approximately 2 hours of study time outside of class for every one hour in class. Since this is a 4-unit class (one unit lab class included), you should expect to study an average of 8 hours outside of class each week. Some students may need more outside study time and some less.

The Physics Department offers TA tutoring. The tutoring schedule can be found at physics office (McL 173). For additional free tutoring on campus, contact the Learning Center in the Peters Building Annex Trailers (phone 278-3052 or visit **www.csufresno.edu/learningcenter**).

Homework:

Homework will be assigned on roughly a weekly basis (about 10-15 problems each assignment). The homework is due before midnight (11:59pm) on each due date (usually a week after assigned). One lowest grade will be dropped. **The homework problems will come from the textbook, but be done online through WEB ASSIGN (http://www.webassign.net).** To sign on, your username is your last name plus the initial of your first name (for example: John Smith— "smithj"), your password is your student ID number, the institution part you can enter "csufresno". Homework solutions will be post on the class website after grading. **LATE HOMEWORK WILL NOT BE ACCEPTED, NO MAKE UP HOMEWORK.** Work together with classmates or consulate with fellow students is encouraged but copying the homework of another is considered cheating. You will get zero point in this case. Also remember that just

copying your classmate's solution will not increase your knowledge and you will not learn what you will need to know for the exams.

Quizzes:

There are some unannounced quizzes on roughly a weekly basis. The quizzes will be given any time during a lecture of the class (even one minute after the class starts or one minute before the class ends, make certain attending the class on time). The quiz problems will be based on the lecture content to be performed on that day or the previous one. The format of quizzes is multiple choices. Students will answer their quizzes by using *i-clicker*s. So *i-clicker* is required for each student enrolling this class. Students can register their i-clickers in class (we will discuss this issue on first day in class) or through website http://www.iclicker.com/registration/ (using your full name exactly the same shown in class roster). **There are no make up quizzes.** In addition, it is your responsibility to keep your i-clicker **secure** through all semester. No excuse for i-clicker lost or stolen.

Exams:

There will be three in-class midterm tests and one comprehensive final exam. All midterms and final are **CLOSED BOOK** exams. The format of tests is multiple choices. One lowest midterm grade (**non-zero lowest one**) will be dropped. You are allowed to bring a non-programmable calculator, a Scantron form (882-E or -ES). You will be provided with a formula sheet for each test by the instructor. Your own formula sheet is not allowed in each test. There is **no make up exams** in general unless **documented** medical or legal excuses (a judgment will be made by the instructor and/or the department) must be provided **at least three days before** a missed exam if allowances are to be made

Laboratory:

Labs are an integral part of this course. Attendance is mandatory. Please keep in mind that **F in the lab automatically means F in this class**.

Your lab instructor will address the lab policy and schedule in detail in the lab section you attend.

Course Grading:

Your grade in this class will be based on:

Lab (lab reports and lab quizzes)	20%
Homework	20% (~2% each)
Quizzes	10% (~0.5% each)
3-50min midterm tests	30% (15% each, two midterm counted)
Final exam (comprehensive)	20%

Exam Schedule (tentative date and content):

1ˢᵗ midterm:	Monday, Sept. 21	Ch. 1, 2, 3
2ⁿᵈ midterm:	Wednesday, Oct. 21	Ch. 4, 5, 6, 7
3ʳᵈ midterm:	Wednesday, Nov. 18	Ch. 8, 9, 10, 14
Final exam:	8:45 – 10:45 AM Wednesday, December 16 (Comprehensive exam)	

 Final Grades: A 85.0~100, B 75.0~84.9, C 60.0~74.9, D 50.0~59.9, F 0~49.9.

Grade will not be curved.

Attendance:
>   If you are absent from class, it is your responsibility for the material presented in the
>   lecture, reading assignments, the homework, and to check on announcements made while
>   you were away.

Right to Change:
>   The instructor reserves the right to change the course policy during the term due to
>   unforeseen problems in the course pace, fairness, conflicts, etc.

UNIVERSITY POLICIES

Cheating and Plagiarism: "Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term 'cheating' not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one's own work." Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the university. For more information on the University's policy regarding cheating and plagiarism, refer to the Class Schedule (Legal Notices on Cheating and Plagiarism) or the University Catalog (Policies and Regulations).

Disruptive Classroom Behavior: "The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. ... Differences of viewpoint or concerns should be expressed in terms which are supportive of the learning process, creating an environment in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop and understanding of the community in which they live . . . Student conduct which disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class."

Students with Disabilities: Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for learning and evaluation. For more information, contact Services to Students with Disabilities in University Center Room 5 (278-2811).

Honor Code: "Members of the CSU Fresno academic community adhere to principles of academic integrity and mutual respect while engaged in university work and related activities."
You should:
   a) understand or seek clarification about expectations for academic integrity in this course (including no cheating, plagiarism and inappropriate collaboration)

b) neither give nor receive unauthorized aid on examinations or other course work that is used by the instructor as the basis of grading.

c) take responsibility to monitor academic dishonesty in any form and to report it to the instructor or other appropriate official for action.

Instructors may require students to sign a statement at the end of all exams and assignments that "I have done my own work and have neither given nor received unauthorized assistance on this work."

Computers: "At California State University, Fresno, computers and communications links to remote resources are recognized as being integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology Services (http://www.csufresno.edu/ITS/) or the University Bookstore. In the curriculum and class assignments, students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources."

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University Policies can be found online:
http://www.csufresno.edu/academics/policies_forms/instruction/RequiredSyllabusPolicyStatements.htm

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UNIVERSITY POLICIES *end*

Course Content / Tentative Course Schedule:
Subject to Change: This syllabus and schedule are subject to change in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent.

Week	Date	Topics	Chapter
one	08/24 08/26 08/28	Course introduction, physical quantities, units, scientific notation & significant figures, and math review	1.1, 1.3-1.8
two	08/31 09/02 09/04(no class)	Motion, inertia, and Newton's three Laws	2.2-2.4
three	09/07(no class) 09/09 09/11	Linear motion, free fall, friction, and forces in 1-D	3.1-3.4
four	09/14 09/16 09/18	Transmitting forces, and terminal velocity 2-D and 3-D motion, projectile motion, relative velocity, and forces in 2-D and 3-D	3.5, 3.7 4.1-4.4 4.6
five	09/21 09/23 09/25	**Exam 1: Ch 1-3 (09/21)** Projectile motion (continue) Uniform circular motion and centripetal forces	4.6 5.1-5.2
six	09/28 09/30 10/02	Gravitation, and Kepler's laws Work, kinetic energy and potential energy	5.3, 5.4 6.1-6.4
seven	10/05 10/07 10/09	Energy conservation, and power Linear momentum, and impulse; elastic and inelastic collision; momentum conservation	6.5-6.7 7.1-7.4
eight	10/12 10/14 10/16	Linear momentum (continue) Rotational motion, torque, angular speed and acceleration, and moment of inertia	7.5-7.7 8.1-8.4
nine	10/19 10/21 10/23	Rotational motion (continue) Rotational kinetic energy, **Exam 2: Ch4-7 (10/21)**	8.5, 8.6 9.1-9.2
ten	10/26 10/28 10/30	Angular momentum and conservation; precession Pressure and density of fluids, Buoyancy, Pascal's and Archimedes's principles	9.3-9.5 10.1-10.4
eleven	11/02 11/04 11/06	Fluid continuity and Bernoulli's equation Temperature and zeroth law of thermodynamics	10.5 14.1-14.4
twelve	11/09 11/11(no class) 11/13	Thermal expansion, phases and phase changes, heat transfer mechanism Ideal gas, molecular model	14.5-14.8 15.1, 15.2
thirteen	11/16 11/18 11/20	Kinetic theory and diffusion of ideal gas **Exam 3: Ch8-10, 14 (11/18)**	15.3-15.5
fourteen	11/23 11/25(no class) 11/27(no class)	Thermodynamic system and energy transferring	16.1-16.3
fifteen	11/30 12/02 12/04	Thermal processes and heat engines, three laws of thermodynamics Harmonic motion	16.4-16.8 11.1, 11.2
sixteen	12/07 12/09 12/11(no class)	Hooke's law, harmonic motion and energy, and resonance	11.3-11.5
Final week	**12/16 (Wed)**	**Final exam**	**8:45-10:45am**