Instructor:	Stefano Profumo
Office:	ISB, Room 325
Phone Number:	831-459-3039
Office Hours:	Wednesday 11AM-12:30PM, ISB 165
E-mail:	profumo@ucsc.edu

Teaching Assistant:	Jonathan Cornell
Office:	ISB, Room 320
Phone Number:	831-459-xxx
Office Hours:	TBD
E-mail:	jcornell@ucsc.edu

Grader:	Amita Kuttner
E-mail:	akuttner@ucsc.edu

Course Web Pages

- http://scipp.ucsc.edu/∼profumo/teaching/phys105_13/phys105_13.html
- eCommons Webpage

Class Hours

Lectures: Tu-Th, 8:00 AM - 9:45 AM, N. Sci Annex 101
Discussion Sections: TBD

Course Description

- Newton's Laws of Motion
- Energy and Angular Momentum
- Oscillations and Normal Modes
- Calculus of Variations and Lagrangian Mechanics
- Two-body Central-Force Problems
- Mechanics in Noninertial Frames
- Rigid bodies
- Collision theory
- Hamiltonian mechanics
- Dynamical systems, order and chaos in Hamiltonian systems

Prerequisites

- Physics: 5A/L, 5B/M, 5C/N, 116A, 116B

Recommended Textbooks (on reserve)

- *Classical mechanics* by J. R. Taylor
- *Classical mechanics* by T. W. B. Kibble and F. H. Berkshire (5th edition, 4th edition fine too)

Other Textbooks

- *Classical Dynamics* by S.T. Thornton and J.B. Marion (recommended, but very expensive!)
- *Classical Mechanics, 3rd edition* by Goldstein, Poole, and Safko (a graduate-level very complete textbook)
- *Classical Dynamics: a contemporary approach* by J.V. José and E.J. Saletan (advanced, but recommended)
- *Mathematical Methods of Classical Mechanics* by V.I. Arnold (very advanced, but recommended for those with an inclination towards math)
- *Analytical Mechanics* by A. Fasano and S. Marmi (as above - this is the book your Instructor learned this stuff from)
- *Mechanics* by L.D. Landau and E.M. Lifshitz (very good, but very "Soviet")
- *The Elements of Mechanics* by G. Gallavotti
- *Theoretical Mechanics* by E. Neal Moore
- *Classical Dynamics of Particles and Systems* by J. Marion
- *Classical Mechanics* by V. Barger and M. Olsson

Note: the Relevant Library Sections are QA805 and QC125

Course Grading and Requirements

Student evaluations will be based on their performance in the following three tasks. The tasks and their relative weights in determining the students' overall course grades are given below (see however below for special "reward points"):

(i) **35%** Weekly Homework (9 problem sets)

(ii) **25%** Midterm Exam (Tuesday, October 29, 8:45 AM – 9:45 AM)

(iii) **40%** Final Exam (Wednesday, December 11, 12:00 PM – 3:00 PM)

Homework

Weekly homework assignments will be posted on the eCommons website each Thursday (with the exception of Thanksgiving Thursday November 28) and are due in class, at the beginning of class on the Thursday of the following week. The homework problem sets are (effectively) not optional, and will consist of a few problems. You are encouraged to discuss the class material and homework problems with your classmates and to work in groups, but all submitted problems should represent your own work and understanding. Late homework can be submitted to the grader, but will not contribute any points to the final grade. I will grant **one** late homework exception-to-policy, for exceptional, well-motivated and documented reasons. The Grader will grade each homework, and is responsible for the given grade. Grades for each homework problem will consist of 2 points (perfect, or mostly correct), 1 point (less than 50% correct) or 0 points. Homework solutions may be made available on the course website on the homework due date or shortly thereafter. The TA is responsible for the homework solutions.

Discussion Section and Reward Points

Discussion Section will be typically devoted to discussing problems in the assigned homework. The discussion will be lead by the TA, who will survey the audience and suggest which homework problems to examine at the beginning of the section. The problems will then be discussed at the board by "volunteers", who will be awarded "Reward Points" (at the discretion of the TA). Reward Points will be counted as an extra credit towards the final, overall course grade and can contribute up to 10% of the overall grade.

Midterm and Final

The midterm exam and the final exam will be held in the same classroom as the lectures. The midterm will be a 1 hour written exam in class (regular lecture time) on Tuesday October 29, while the final (Wednesday, December 11, 12:00 PM – 3:00 PM) will be three hours long and cover the complete course material. Both the midterm and the final will be closed-book, but you will be allowed one page, A4 format, front and back, of notes. Only non-graphical, non-programmable calculators will be allowed (it will be up to the discretion of the Instructor to decide whether a calculator is or not allowed). Laptop computers and more or less smart cellular phones of any kind will not be allowed. A practice midterm and final will be handed out a week before the exams. You must take the final exam to pass the course. The midterm will be worth 25% of the grade, the final 40%

Final Grade

The minimal score not to fail the class is 60%.

The final grade will reflect the following breakdown:

- 9 homework assignments: **35%**
- Midterm exam: **25%**
- Final exam: **40%**
- Rewards points: **potential +10%**

The final grade will follow the percent guideline below:

- 60% to 70%: **C** range
- 70% to 85%: **B** range
- 85% to 100%: **A** range