SUNY Orange SYLLABUS

35104 -Physics for Science & Engineering ll

3 lect., 3 lab., 4 cr. (Spring)

The study of mechanics is continued from the first semester course (35103). Topics include: gravitational theory, fluid statics and hydrodynamics; oscillations and simple harmonic motion, traveling waves, vibrating systems and sound; temperature and heat measurement, heat transfer, kinetic theory of gases, first and second law of thermodynamics; atomic physics of the Bohr atom, introduction to nuclear structure.

Prerequisite: 35103, completed or concurrent enrollment in 38205 is required.

TEXT AND MATERIALS:

This course will cover the topics presented in chapters 10 to 26 of the text: Halliday, Resnick & Krane, Physics, (N.Y.: John Wiley & Sons, 2002) [Fifth Ed.] Additional material will be supplied. The student will also need a ruled laboratory notebook and a scientific calculator. Although a programmable calculator is not essential for the course, students wishing to get a head start should obtain an HP 48G+, or an HP 49. Laboratory materials will be distributed throughout the semester.

RELATIONSHIP TO PROGRAMS:

Physics 35104 is designed for the Engineering Science program. All engineering students, from electrical to chemical, should take this physics sequence. It is also the course of choice for one planning to major in Physics. A student majoring in Chemistry (as opposed to Chemical Engineering) would be better advised to take General Physics l with Calculus (38105-6). Such a student should speak with his or her advisor regarding course selection. Although Calculus ll (38206) is the desired prerequisite for 35104, a student retaking Calculus l (38205) can be admitted to the course with the permission of the Department Chair.

COURSE OBJECTIVES:

The student who successfully completes this course can

- demonstrate an understanding of methodologies employed by natural scientists.
- employ observation, hypothesis development, measurement, and data collection on an appropriate level.
- describe the importance of modeling in the pursuit of scientific understanding.
- quantify the physical concepts of rotational motion, wave motion and gases.
- organize the details regarding the physical contact interaction of point particles and extended bodies.

- apply the concept of potential function to a gravitational system.
- perform an iterative modeling of gravitational accelerating and frictional drag.
- solve fluid static and dynamics problems through applications of Newton's Laws.
- relate the concept of heat to the concept of motion and to the constraints of thermodynamics.
- apply force/energy concepts to atomic and nuclear structure.
- organize laboratory equipment toward the investigation of physical principles.
- prepare a laboratory report of findings and observations in a clear and professional fashion.
- reduce data, both numerically and graphically, using spreadsheets.

GRADING SYSTEM:

The grading for this course will be determined as follows

Exam # 1 --	15 %
Exam # 2 --	15 %
Exam # 3 --	15 %
Final Exam --	20 %
Lab. Work --	20 %
Homework/Quizzes	15 %

ALL CLASS ASSIGNMENTS (HOMEWORK SETS & LAB REPORTS) WILL BE DUE ON FRIDAY, AS ANNOUNCED BY THE INSTRUCTOR IN CLASS. NO LATE ASSIGNMENTS WILL BE ACCEPTED.

INSTRUCTOR OFFICE HOURS: -- TBA

ATTENDANCE AND WITHDRAWAL:

Perfect attendance is assumed in this course. Without this attendance and dedication to the homework one will not be successful in Physics. The student's grade will reflect any lack of attendance. It is the student's responsibility to speak with the instructor and withdraw from the course if things are not going well. The instructor will not withdraw a student unilaterally. An early consult with the instructor can save a great deal of later confusion.

SUPPORT SERVICES:

Tutoring services are available in the Library. There is also tutoring in Physics available in the Mathematics Study Lounge in Ha 311. The Physical Science Study Lounge (Harriman 315) has proven a valuable resource for students assisting each other in reviewing the material and working together solving homework problems. This strategy, used correctly, can be of great assistance to you. Take advantage of it. Also, get to know your advisor on a personal level.

There are services available for students with disabilities. Any such conditions should be communicated privately to the instructor on the first day of class so that any necessary special arrangements or accommodations can be made.

The following texts are on reserve in the Library. They can be very helpful to you if you take advantage of them.

J. Richard Christman, A Student's Companion to Halliday/Resnick/Krane. This guide is matched to our text and it is a good supplementary review text. (Reserve # 178)

Edward Derringh, Selected Solutions to Halliday/Resnick/Krane. (Reserve # 177.) This book is matched to the text we are using. It is important that you consult this book only after you have worked independently on the assignment for a significant amount of time. Using this resource unwisely can seriously impact on your performance in the course. Simply transcribing these solutions for submission to the instructor will result in an F for the course, since you will not be able to pass the examinations without doing your own hard work on course assignments. The purpose of having the manual on reserve is to assist you when the instructor is not available.

Fredrick Bueche, Shaum's Outline of College Physics. This text has excellent, clearly worked out problems related to every section of the text. Reserve # 179

Alvin Halpern, Schaums Outline -- Beginning Physics l -- Mechanics and Heat. This text is similar to Reserve # 179, but contains only material covered during the first semester of 35101 and 35106 (General Physics). The material covered in both Engineering Physics I & II (35103-4) is explained in this resource on an elementary level. Therefore this is a good source of material to get warmed up on difficult concepts.

Serway and Faughn, College Physics and Faughn & Tigue, Instructors Manual With Solutions for Serway and Faughn. These two books should be used together. The complete solutions manual matches this non-calculus text and this resource should be helpful - especially if you have missed some of the material the first time around. (Reserve # 183)

NOTE REGARDING CLASS SYLLABUS

The following weekly lecture schedule should be viewed as tentative to the extent that some adjustments may seem advisable as the course progresses.

A detailed syllabus with HW assignments is distributed during the first class meeting.

SYLLABUS

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WEEK	TOPIC	CHAPTER
1.	The Gravitational Force	14-1 to 14-5
2.	Gravitational Potential and Satellites	14-5 to 14-9
3.	Fluid Statics	15-1 to 15-6
4.	Hydrodynamics	16-1 to 16-6
5.	Oscillating Systems	17-1 to 17-4
6.	Energy in Oscillating Systems	17-5 to 17-8
7.	Traveling Waves	18-1 to 18-10
8.	Superposition & Sound	19-1 to 19-9
9.	Zeroth Law; Temperature & Ideal Gas	21-1 to 21-5
10.	Kinetic Theory & Molecular Speeds	22-1 to 22-7
11.	The First Law & Conservation of Energy	23-1 to 23-8
12.	Entropy & Second Law	24-1 to 24-8
13.	Forces & Potential, The Electrical Force	46-1 to 47-3
14.	Atomic Physics	47-4 to 48-4
15.	The Nucleus	50-1 to 50-8