ORANGE
COUNTY
COMMUNITY
COLLEGE
State University of New York

Department of Science & Engineering

SYLLABUS

Physics for Science and Engineering I

Catalog # -- 35*103

FALL 2006

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35103 - Physics for Science & Engineering l

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

The science of measurement; vector analysis; rectilinear motion; Newton's laws and their applications to particle dynamics; conditions for equilibrium; rotational kinematics and dynamics and angular momentum; conservation of energy; conservation of linear and angular momentum; foundations of special relativity; introduction to relativistic kinematics.

Prerequisites: Completed or concurrent enrollment in 38205 is required.

TEXT AND MATERIALS

This course will cover the topics presented in the first 10 chapters and chapter 39 of the text: Tipler and Mosca, Physics For Scientists and Engineers, Fifth Edition Extended (New York: W. H. Freeman and Co., 2002) ISBN 0-7167-4389-2. The student will also need a SEWN ruled laboratory notebook and a scientific calculator. Although a programmable calculator is not required at this time, it will be later. A student wishing to acquire a programmable calculator should purchase the HP 48. Laboratory materials will be distributed throughout the semester.

RELATIONSHIP TO PROGRAMS

Physics 35103 is specifically designed for the engineering or physics major. A Liberal Arts and Science major should consider taking General Physics 35101-2 or General Physics (Calc.) 35105-6. If in doubt about the proper physics course to take, consult with your advisor or with the department chair.

COURSE OBJECTIVES

The student who successfully completes this course can:

- demonstrate an understanding of modeling methods employed by natural scientists.
- employ observation, hypothesis development, measurement and data collection on an appropriate level.
- move fluently through the Systeme Internationale rationalized MKS units.
- calculate vector dot and cross products when applied to physical systems.
- solve the equations dealing with uniformly accelerated motion, both translational and rotational.
- apply Newton's Laws to 2-dimensional translation or rotational systems of one or more particles.
- demonstrate the relationship between forces and potential functions in conservative systems.
- solve problems dealing with energy and momentum conservation.
- extend classical physics with its inertial frames into the relativistic range of velocities.
- translate physical problems into mathematical expressions and solve resulting equations.

GRADING SYSTEM

The grading for this course will be determined as follows

Exam # 1 --	14.29 %	Cumulative MC Final Exam --	14.29 %
Exam # 2 --	14.29 %	Laboratory Work & Lab Book --	14.29 %
Exam # 3 --	14.29 %	Homework/Quizzes--	14.29 %
Exam # 4 --	14.29 %	There are no make-up examinations!	

*** The decimal % simply indicates that each component above represents 1/7 of final grade.**

For the most part the exams will consist of problem solving or derivations. Occasionally some multiple-choice questions will be used. The cumulative part of the final exam will be multiple-choice questions. You may use your class notes for the cumulative final exam. It is in your best interest to take decent notes in class.

INSTRUCTOR OFFICE HOURS

Instructor: Dr. John Cummins
Office: Harriman Hall # 317
Phone Ext: 341-4562
jcummins@sunyorange.edu

Hours: MON & WED 9:00 a.m. to 11:00 p.m.
TUES 12:00 p.m. to 1:00 p.m.
FRI 9:00 a.m. to 11:00 a.m.

I am around most of the day and you should feel free to stop by any time. It is to your advantage to seek me out and to clear up difficulties as soon as possible. Without organized hard work, you will not do well in this course. On the other hand, if you work diligently you should have every hope of success.

ATTENDANCE AND WITHDRAWAL

Perfect attendance is assumed in this course. Without such attendance and dedication to the homework one will not be successful in Physics. The student's grade will reflect any lack of attendance, simply because of the difficulty of the material. 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 initiate the withdrawal. An early consult with the instructor can save a great deal of later confusion. MAKE-UP exams are non-existent.

SUPPORT SERVICES

The Physical Science Study Lounge 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. Support one another in the engineering study lounge! Also, get to know your advisor on a personal level. Keep in mind that the instructor is also part of your "support service."

Tutoring services are also available in the learning resource center. Finally, if you have a documented disability and anticipate needing special accommodations in this course, please contact the Office of Disability Services located on the 3rd floor of the College Commons, (845) 341-4077, follow their guidelines regarding submitting documentation and bring your official Accommodation Notice to me as soon as possible.

RESERVED BOOKS

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 a text in the study lounge and it is a good supplementary review text. (Reserve # 178)

Edward Derringh, Selected Solutions to Halliday/Resnick/Krane. (Reserve # 177.) This book is not matched to the text we are using. A copy of the text can be found in the Engineering Lounge It is important that you consult solutions manuals only after you have worked independently on the assignment for a significant amount of time.

Arthur Beiser, Shaums Outline, Applied Physics. The solved problems in this book are at a lower level than the problems in the text. They are good confidence builders and can be helpful in this regard. Reserve # 180

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

A detailed daily lecture schedule with homework assignments follows on next page.

WEEK	TOPIC	CHAPTER
1.	Orientation/Measurement	1 -1 to 1- 7
2.	One Dimensional Motion	2 - 1 to 2 - 6
3.	Force & Newton's Laws	3 -1 to 3 - 8
4.	Two and Three Dimensional Motion	4 -1 to 4 - 6
5.	Applications of Newton's Laws	5 -1 to 5 - 7
6.	Momentum	6 - 1 to 6 - 5
7.	Systems of Particles	7-1 to 7- 6
8.	Rotational Kinematics	8-1 to 8-6
9.	Rotational Dynamics	9-1 to 9-7
10.	Angular Momentum	10-1 to 10-6
11.	Work & Kinetic Energy	11-1 to 11-8
12.	Potential Energy	12-1 to 13 -7
13.	Relativity & Lorentz Transforms	20 -1 to 20 - 5
14.	Vel. Transforms, Momentum and Energy	20-6 to 20 -10
15.	Review and Summary	

		MON.	WED.	FRI.	LAB.
Aug.	Week 1	**Intro. -- Units 1-1 to 1-5** 10,13,19,21,29,52	**Velocity & Accel. 2-1 to 2-2** 43,45,48,50,55	**1-D Kinematics 2-2** 65,67,69,72,75	**Laboratory Intro. -- Units** **Graphical Analysis**
Sept.	Week 2	**LABOR DAY NO LECTURE**	**Integration 2-4** 72,73,74,77,91,100	**Vectors 3-1 to 3-2** 38,39,41,42,44	**Vectors: Resultants and Equilibrants**
	Week 3	**Position, Vel. & Accel. Vectors 3-3** 47,48,55,56,58	**Projectile Mtn - 1 3-5 to 3-6** 64,76,84,86,87	**Projectile Mtn. - 2 3-4** 80,81,82,83,90,93	**Galileo and Motion** **Power Relationship**
	Week 4	**Uniform Circular Mtn. 3-5** 71,72,73,75	**Newton's Laws 4-1 to 4-4** 29,34,37,41,45	**Newton's Laws (cont.) 4-5 to 4-7** 46,52,57,81,83,98	**Acceleration of Gravity** **The Standard Deviation**
	Week 5	**Frictional Forces 5-1** 16,18,26,27,31	**Applications-Newton 5-1 to 5-2** 33,34,43,45,55,67	**EXAM # 1 Chap. 2 - 4**	**Projectile Motion**
Oct.	Week 6	**Dynamics of Circular Motion 5-3 to 5-4** 69,70,104,115	**Work and Energy 6-1** 20,21,22,23,24	**Dot Product 6-2** 25,29,36,37,38,39	**Newton's Second Law**
	Week 7	**Potential Energy <TUES!> 6-3 to 6-3** 47,51,55,56,59,60	**Conser. Forces 6-4** 72,73,74,75,86	**Mech. Ener. Conserv. 7-1 to 7-2** 18,19,20,21	**Atwood and Gravity**
	Week 8	**Gen. Energy Conser. 7-3 to 7-4** 23,24,25,26,47,49	**Recitation 7-1 to 7-4** 53,56,61,68,74,85	**Center of Mass 8-1 to 8-2** 3,25,30,33,34,35,37	**Uniform Circular Motion 5-4**
	Week 9	**C.M. and Momentum 8-3 to 8-5** 43,44,48,50,52,54	**Collisions 8-6** 57,61,63,69,71,73	**EXAM # 2 Chap. 5 - 8**	**Inclined Plane and Friction**
Nov.	Week 10	**C.M. Reference Frame 8-7 9-7** 85,97,102,104,105,117	**Rotational Kinematics 9-1 to 9-2**	**Moments of Inertia 9-3** 36,37,38,39,40,42	**Torque and Equilibrium**

Week 11	**Newton & Rotation** **9-4 to 9-5** 43,46,47,50,58,59,60	**Rolling Objects** **9-6** 61,62,63,64	**Rotational K. E.** **9-6** 67,68,69,70	**Momentum Conservation**
Week 12	**Energy Conservation** **9-1 to 9-6 Summary** 73,74,75,76	**Torque & Angular Momen. 10-1 to 10-2** 29,34,35,44,45,46	**Ang. Mom. Conser.** **10-3 to 10-4** 49,50,52,67	**Momentum Conservation** **2 - Dimensions**
Week 13	**Exam # 3** **Chap. 9**	**Thanksgiving Holiday**	**Thanksgiving Holiday**	**Thanksgiving Holiday**
Dec. Week 14	**Relativity - Einstein** **Chap. R -- p. 339** 5,6,9,10,12,13,14	**Conseq./Einstein's Postulates** **Chap R -- p. 139** 16,18,19,20,21	**Lorentz Transform** **39-3 to 39 - 4** E: 9,10,11,12,13,	**Moment of Inertia**
Week 15	**Relativistic Momen.** **20-8** 15,16,17,25,32,33	**Relativistic Energy** **20-9** 34,36,37	**Relativity / Summary** **Chap 20** 48,50	**Work Energy Theorem**
Week 16	**FINAL EXAM: Chaps. 10, R & 20 + Cumulative**			**Time: TBA**