

PHY 2048 – CALCULUS BASED PHYSICS I – SPRING 2008

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Office Hours: *Tuesday:* 1:30-3:30 PM; *Thursday:* 1:30-3:30 PM; *Friday:* 11:00AM-12:00 PM. You are welcome to make a formal appointment for another period or to drop by my office to see if I am available for consultation at that time.

Required Textbook: “Fundamentals of Physics”, 8th Edition, Regular Edition by Halliday, Resnick, Walker, Editors: Wiley. ISBN: 978-0-470-04472-8

Required Web-based Homework System: Mastering physics: Standalone Calculus Based <http://www.masteringphysics.com/> (You need to purchase a license!)

Optional Textbooks: Schaum’s Outlines, “Physics for engineering and science”, Editor: McGraw-Hill, ISBN: 007008498X

Prerequisites: PHY 1020C (Intro to Physics) or a good high school physics course with grade B, MAC 2311 (Calculus I). **Co-requisites:** MAC 2312 (Calculus II)

General Education: This course touches on several areas of importance for general education by:

- demonstrating a general knowledge of current scientific understanding of the history and nature of the universe, the earth, and of life forms
- demonstrating a general knowledge of the methods and traditions of analysis in the natural sciences
- demonstrating proficiency in solving problems using mathematical concepts and quantitative reasoning

Objectives: As you progress through this course, at the very least, you should be able to understand basic physics concepts and to be able to solve problems involving:

- 1) various physics units
- 2) vector addition and multiplication
- 3) position, velocity, acceleration, free fall motion, projectile and circular motion
- 4) Newton’s laws of motion with friction
- 5) Work, potential energy, kinetic energy, total energy, and power
- 6) System of particles, rigid bodies, rotational kinematics and rotational dynamics
- 7) Conservation laws of motion (energy, momentum, and angular momentum)
- 8) Gravitation (force, field, and potential energy)
- 9) Vibratory motion and wave phenomena (springs, standing and traveling waves, interference)
- 10) Thermodynamics (temperature, heat, internal energy, entropy, calorimetry, heat transfer, ideal gases, specific heat, latent heat, first and second laws of thermodynamics)

Class sessions: In this course, you will be introduced to basic physics principles in the areas of classical mechanics; vibration and waves; thermodynamics. You will apply these principles and those of differential and integral calculus to solve a variety of problems in the underlined areas of physics.

The class will meet on Tuesdays and Thursdays (building 50/ room # 1406) from 10:50 AM to 12:05 PM, and Fridays from 12:00 to 12:50 PM. The classes will generally be lectures on the topics listed in the attached schedule. Problems, which illustrate the subjects being discussed, will be solved during the lectures. You should study the assigned text material before the period in which it will be discussed so that you will be prepared to ask questions during class about those concepts you do not understand. Average student should expect to spend at least 3 to 5 hours studying the material outside of class for every 75-minute class meeting in order to receive an average grade. To help you to more thoroughly understand the concepts of physics, you will be required to answer questions and solve problems outside of class.

Homework: I am going to use web base homework system “Mastering Physics” to assign and grade homework. You should go to the mastering physics web site: <http://www.masteringphysics.com/>. Please click on the “**Standalone calculus based**” icon and you will be prompted to the purchase/registration site. First you have to purchase a license. This can be done immediately with your credit card. After you purchased the license you will be given an access code. Please use this access code to register for the course and establish your login and password. The “Mastering Physics” name of the course is GASPAROV2048S08. Please go over the “Introduction to Mastering physics” assignment and first homework (HW#1) assignment that is due on Tuesday, January 14th.

Introduction assignment will not count for credit. Some questions in this intro assignment ask you to open hints and submit wrong answers deliberately as you explore how the program works. However the HW#1 and all other home work assignments thereafter will count! You can expect a weekly homework assignment that will be available to you at least a week prior to the due date. The grading of your homework is instantaneous!

Please note that you will not get any credit for assignment that is past due!

I am sure you will have questions about this home work system and I am happy to answer these questions during our regular meetings and over e-mail. I regularly check my e-mail inbox and prefer this type of communication over other types.

I strongly urge you to use Osprey e-mail. Please note that the forward you might have to your “Hot-mail”, “Yahoo”, “AOL” or any other “off-campus” e-mail accounts may have problems.

Exams: During the semester, four midterm exams will be given. These exams will consist of questions and problems similar in content and difficulty to the problems in your homework assignments, the end-of-the-chapter problems. Exam subjects may come from any previously assigned material.

All exams are **closed book and closed notes**. You may bring up to three sheets of 8.5” x 11” paper on which you have personally written in ink or typed any formulas, constants, and conversion factors that you think will be useful. Photocopies are not permitted.

You may write your exams in pencil. You must include the correct SI units with all answers that require a value for a physical quantity. All numerical answers must be written with a precision of two significant figures unless you are specifically directed to do otherwise. Circle all of your answers. Justify all of your answers. **You will receive no credit for unsupported, or incompletely supported, answers.**

Where your solution to a problem requires you to manipulate one or more formulas, you should retain the formulas in symbolic form for as much of the manipulation as possible. This will help you to follow your train of thought and to detect mistakes. Once you have your answer on paper in symbolic form, replace each symbol with its numerical value, including correct units, before entering them into your calculator. If you follow this procedure, I will be able to give you the appropriate partial credit.

A score of zero will be assigned for each missed exam. In order to accommodate an emergency situation or illness that might require you to miss an exam, or cause you to perform at an unusually low level, the lowest score from the four midterm exams will not be counted in your final grade. No make-up midterm exams will be given.

Grades:

Categories, and their weights, which contribute to your total score are as follows:

Midterm exams (3 highest scores)	60%
Final examination	20%
Homework	20%

The initial percentile ranges for determining final grades are as follows:

A	93.0 - 100
A-	90.0 - 92.9
B+	87.0 - 89.9
B	83.0 - 86.9
B-	80.0 - 82.9
C+	70.0 - 79.9
C	65.0 - 69.9
D	50.0 - 64.9
F	0 - 50.9

The instructor reserves the right to lower the minimum score required to achieve a particular passing grade. If made, such changes will be announced in class. **Assigned grades, including the final grade for this course, may be adjusted for academic misconduct!**

Any changes to the above class description or the following schedule will be announced in class. It is the responsibility of the student to keep abreast of any announcements made during class.

Tentative Schedule					
	T	Th	F	Lecture Topic	Study Assignment
					<u>Chapter: Sections</u>
January	8			Introductory lecture	1: all
		10		Position, displacement, velocity	2:1-5
			11	Acceleration, motion with constant acceleration	2:6-9
	15			Integration, review	2:10; HW #1 due
		17		Vectors and their properties	3:1-8
			18	Position, velocity, and acceleration in two and three dimensions	4:1-4
	22			Projectile and circular motion	4:5-9; HW #2 due
		24		Newton's first and second laws	5: 1-6
			25	Forces in nature, Newton's third law	5: 7-9
	29			Review	HW #3 due
		31		EXAM I	Ch. 2-5
February			1	Friction	6:1-3
	5			Drag force, uniform circular motion	6: 4-5
		7		Work and kinetic energy	7:1-5; HW #4 due
			8	Work of various forces, power	7: 6-9
	12			Potential energy and conservation of mechanical energy	8:1-5
		14		Potential energy curve and equilibrium,	8:6-8
			15	Review	HW #5 due
	19			EXAM II	Ch. 6-8
		21		Center of mass, linear momentum Conservation of linear momentum	9:1-8
			22	Kinetic energy of the system Collisions	9:8-11
	26			Rotational kinematics and kinetic energy.	10:1-5; HW #6 due
		28		Moment of Inertia,	10: 6-7
			29	Newton's second law for rotation and its applications, Review	10: 8-10
March	4			Rolling, translation, rotation. Kinetic energy of rolling	11:1-5; HW #7 due
		6		The vector nature of rotation and angular momentum. Conservation of angular momentum.	11:6-11
			7	Gyroscope and other applications of angular momentum conservation	11:12
	11			Review	HW #8 due

		13		Exam III	Ch. 9-11
			14	Newton's law of gravity, Gravitation near Earth surface	13:1-4
	18			Spring Break (no classes)	
		20		Spring Break (no classes)	
			21	Spring Break (no classes)	
	25			Gravitation Potential energy, planets Simple harmonic motion and its energy	13: 5-8 15:1-4
		27		Oscillating systems	15: 5-9
			28	Review; NOTE: March 28th is the Drop Deadline	HW#9 due
April	1			Wave motion	16:1-5
		3		Energy of the wave; wave equation, Superposition of waves	16:6-8
			4	Interference, Standing waves,	16:9-13
	8			Sound waves, and their properties, review	17:1-10; HW#10 due
		10		Exam IV	Ch.13, 15-17
			11	Temperature, heat	18:1-5
	15			Work and heat transfer, Laws of thermodynamics and their applications.	18: 6-12
		17		First law of thermodynamics and ideal gases	18: 3-5
			18	The kinetic theory of gases	19:1-5;
	22			Entropy and the Second Law of Thermodynamics	20:1-4; HW #11 due
		24		Entropy in the real world	20:5-8
			25	Review	
		1		Final Exam 9:00 AM - 10:50 AM	Comprehensive

Abbreviations: T= Tuesday

Th= Thursday

F= Friday

HW= homework