

SYLLABUS

PHS2230 GENERAL PHYSICS I 4 HOURS CREDIT

SEMESTER: SPRING 2012

INSTRUCTOR: Dr. George Saum

Office: Room 16 A & S Bldg. Phone: 573-518-2174 gsaum@mineralarea.edu

Lab: AS 112

HOURS: 12:00 MTWR 10:00 F

Science Department Chair: Dr. Gamble

OFFICE: AS 31

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An introductory course designed to meet the needs of physical science or engineering students. Principal categories covered are: Newtonian Mechanics, Conservation Principles, Mechanical Wave Phenomena, and Thermodynamics.

This course meets for three lectures, one problem session, and one laboratory session per week.

Lecture /Problem	MTWR	1:00	1:50
Lab:	R	2:00	3:50

Prerequisites: Accompanied or preceded by Analytical Geometry and Calculus II , (MAT215).

Textbook:

PHYSICS FOR SCIENTISTS AND ENGINEERS, 8th Edition

R.A. Serway and J.W.Jewett,Jr, Thomson-Brooks/Cole Publishing, 2010 ISBN13: 978-0-495-82781-8
10: 0-495-82781-9

Lab Manual:

Handouts will be provided for each laboratory experiment.

Other Materials:

Scientific calculator. such as TI 30Xa, or Casio fx-260.

SCHOOL POLICIES:

Cell Phones are **not allowed** in the **classrooms**, nor the **computer lab**. When you are in a classroom or the computer lab, please turn your cell phone off or put it on vibrate. Getting a phone call in the middle of class or in a room full of students who are trying to study or take a test can be very disruptive. If you need to take a call or make a call, please take it outside.

MAC's Policy for Disciplinary Action:

"...College discipline shall be exercised when student misconduct adversely affects the college's pursuit of its educational objectives. Misconduct for which students are subject is defined as follows: Dishonesty, such as cheating, plagiarism, or knowingly furnishing false information to the college" (Mineral Area College Board Policy Manual, section 5.72, IA., p. 99).

Attendance:

Disciplined attendance is strongly encouraged.

School policy prohibits a total of more absences than one equivalent classroom week. Poor attendance will severely impact your classroom performance.

American Disabilities Act :

If you have special needs as addresses by the American Disabilities Act and you need any test or course materials provided i alternative format, notify your instructor immediately. Reasonable efforts will be made to accommodate your special needs.

Course Content:

Week	Chapter	Topic
1	1,2	Measurement and Units, One Dimensional Motion
2	3,	Vectors, Planar Motion
3	4,5	Newton's Laws of motion
4	6	Circular Motion, and Linear Momentum
5	7	Work, Energy
6	8	Potential Energy, Conservation of Energy
7	9	Linear Momentum, Collisions
8	10,11	Rotation of Rigid Objects, Rolling Motion, Angular Momentum
9	12,14	Static Equilibrium, Fluids
10	15	Oscillatory Motion
11	16	Propagation of Waves
12	17,18	Wave Motion, Sound Waves
13	19	Temperature
14	20	Laws of Thermodynamics
15	21,22	Heat Engines, Second Law of Thermodynamics
16	21,22	Heat Engines, Second Law of Thermodynamics

LABORATORY EXPERIMENTS

WEEK	EXPERIMENT
1	Measurements
2	Pendulum
3	Force Table and Vectors
4	Atwood Machine, Acceleration of Gravity
5	Projectile Motion
6	Machines
6	Work, Energy, Friction
7	Centripetal Acceleration
8	Ballistic Pendulum
9	Conservation of Linear Momentum
10	Equilibrium
11	Moment of Inertia
12	Modulus of Elasticity
13	Oscillatory Motion
14	Wave Velocity in String
15	Thermal Expansion
16	Specific Heat, Latent Heat

Evaluation:	Homework	10 %
	Lab reports	20 %
	Exams	70 %

GENERAL PHYSICS I SCHEDULE SPRING 2011

DATE	SECTIONS	PROBLEMS	EVEN ANSWERS
Jan	Chapter 1		
11	1.1 Standards, Length, Mass, Time	2,4	$21.46 \times 10^3 \text{ kg/m}^3, 2.307 \times 10^{17} \text{ kg/m}^3$
	1.3 Dimensional analysis	8	
12	1.4 Conversion	13,15,18,21,23	$2.57 \times 10^6 \text{ m}^3$
	1.6 Significant figures	32,33,34	3,4,3,2 796,1.1,17.66
Jan	16 MLK DAY		
Jan	Chapter 2		
17	2.1 Position, velocity, speed	1	
	2.2 Instantaneous Velocity, speed	5,8	5,-2.5,0,5 m/s
18	2.4 Acceleration	12,17	-13428 m/s^2
	2.6 One dim. motion, constant acc.	22,23,25,29	$6.61 \text{ m/s}, -.448 \text{ m/s}^2$
19	2.7 Free falling object	41,43,45	
Jan	Chapter 3		
23	3.1 Coordinate systems	3,5	
24	3.3 Properties of Vectors	7	
	3.4 Components of Vectors	15,19,31,37,47	
Jan	25 Review		
	26 TEST CH 1-2-3		
Jan	Chapter 4		
30	4.1 Position, Vel, Acc. Vectors	1	
	4.2 Two Dim. Const Acc.	5,7	
31	4.3 Projectile Motion	9,16,17	22.55m,52.3 m, 1.176 s
	4.4 Uniform Circular Motion	27,29	
Feb	1 WYSE (Physics Class Cancelled)		
Feb	2	4.5 Tang and Radial Acc.	31,32
		4.6 Rel. Vel. and Acc.	35,37
Feb	Chapter 5		
6	5.1-5 Forces	1,3,5,13	
7	5.6 Third law		
	5.7 Applications	21,24,33,35	253N,165N
8	5.8 Friction	37,39,44,51	$55.1^\circ, 167 \text{ N}$
Feb	Chapter 6		
9	6.1 Circular Motion	1,3,9,11	
13	6.2 Non-uniform Circular Motion	13,14,17,19	4.80 m/s, 700N
14	6.3 Accelerated Frames of Reference	21,23	
Feb	15 Review		
Feb	16 TEST CH 4-5-6		

Feb	20	PRESIDENT'S DAY			
Feb		Chapter 7			
	21	7.1-2	Work by Constant Force	1,6	4704 J
		7.3	Scalar Product of Vectors	11,	
	22	7.4	Work by a Varying Force	14,17,28	24J,-3J,21J, 9kJ,11.7 kJ
	23	7.5-6-7	Work Energy Theorem	31,33,45	
		Chapter 8			
Feb	27	8.1	Conservation of Energy	3,6	5.94m/s,7.67m/s, 147 J
		8.2	Isolated System	7,9	
		8.3	Kinetic Friction	15,17	
	28	8.4	Changes of Mechanical Energy	19,23,2	
		8.5	Power	29,35,38	5905w, 11.147 kw
		Chapter 9			
	29	9.1	Linear Momentum	3	
		9.2	Isolated System Momentum	6,8	1.15 m/s, 5.16x10 ⁻²³ m/s
		9.3	Nonisolated System	11	
Mar	1	9.4	One Dim Collision	19, 23	
		9.5	Two Dim. Collisions	32,34	2.88m/s, 782 J, 5.89m/s, 7.07 m/s
		9.6	CM	36,38	4.66x10 ⁶ m , 13.33 cm, 11.67 c
Mar	7	Review			
Mar	8	TEST Ch 7-8-9			
Mar		Chapter 10			
	5	10.2	Angular Position, Vel., Acc	3,7,9	
		10.3	Angular and Linear Quantities	13,17,19	
	6	10.4	Rotational Kinetic Energy	25,26	184 J, 6m/s, 4 m/s, 8 m/s
		10.5	Moment of Inertia	29,31	
Mar	12-16	SPRING BREAK			
	19	10.6	Torque	35	
		10.7	Torque and Angular Acceleration	40	.309 m/s ² , 7.67 N, 9.21 N
		10.8	Work, Power, Rotational Energy	44,53	2.376 m/s
	20	10.9	Rolling Motion	55,61	
Mar		Chapter 11			
	21	11.1	Vector Product and Torque	1,5	
		11.2	Angular Momentum	11,15	
	22	11.3	Angular Momentum of Rigid Object	24,27	4.5 k kgm/s ²
		11.4	Conservation of Angular Momentum	31,35,41	
Mar		Chapter 12			
	26	12.1	Conditions for Equilibrium	1,	
		12.2	Center of Gravity	3,5	
	27	12.3	Rigid Objects in Static Equilibrium	12,13,23	88.2 N, 58.8 N
		12.4	Elastic Properties of Solids	27,33	
Mar	28	13.1-2	Newton's Laws, Free Fall	3,5,7,11	
	29	13.3	Kepler's Laws	13,17,22	
Apr	4	Review			
Apr	5	TEST CH 10-11-12-13			

Apr	2	Chapter 14 14.1,2 Pressure, Depth, Pascal's Law 14.1 Archimedes Principle	3, 7,8,11 23,27,33	225 N
Apr	3	Chapter 15 15.2 Simple Harmonic Motion 15.3 Energy in a Harmonic Oscillator 15.5 Pendulum	3,5,9,15 19,23 27,31	
Apr	9	Chapter 16 16.1 Propagation	3	
	10	16.2 Sinusoidal Waves 16.3 Speed of Waves	5,7,13 21,27	
Apr	11	Chapter 17 17.1 Speed of Sound 17.4 The Doppler Effect	5,7,17 37,43	
Apr	12	Chapter 18 18.2-3 Standing waves in a String	20,21,23	78.56 Hz, 157,236.314 Hz
	16	18.5 Standing Waves in an Air Column	33,35	
Apr	17	Review		
Apr	18	TEST CH 15-16-17-18		
Apr	19	Classes Cancelled		
Apr	23	Chapter 19 19.2 Thermometers 19.3 Constant Vol. And Abs. Temp		
	24	19.4 Thermal Expansion 19.5 Ideal Gas	8,11 19,21,25	1.2 cm
Apr	25	Chapter 20 20.1 Heat and Thermal Energy		
	26	20.2 Specific Heat 20.3 Latent Heat 20.4 Work and Thermodynamics	3,9 15,17 21,25	
	30	20.5 First Law of Thermodynamics 20.7 Heat Transfer	27,31 39,42	3.36x10 ²⁶ w
May	1	Chapter 21 21.2 Specific Heat of Ideal Gas	15,17	
	2	21.3 Adiabatic Process	19,21	
	3	Chapter 22 22.1 Second Law	1,3	
	7	22.4 Carnot Engine 22.7 Entropy	13,19 37,43	
May	8	Review		
May	9	FINAL MAY 9 12:00 1:40	CH 19-20-21-22	