Physics 100 **Introductory Physics FALL 2014** **Mesa College**

Instructor: Dr. Michael Goldstein

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Course Title: **Introductory Physics 100**

3 hours lecture, 3hours lab, 4units. Letter grade or Pass/No Pass Option

Advisory: Mathematics 46 with a grade of "C" or better, or equivalent or Assessment Skill Level M40.
This course is intended for students who are interested in the basic knowledge of physics with a minimum preparation in mathematics. A comprehensive coverage of subject matter in physics is presented, including mechanics, wave motions, thermodynamics, optics, electromagnetism,
atomic and nuclear physics. Emphasis is on the conceptual aspects, including explanation of natural phenomena. The learning of concepts is reinforced through laboratory work. (FT) AA/AS; CSU; UC Transfer
Limitation: No credit for Physics (PHYS) 100
if taken after a college level course in physics.

REQUIRED MATERIAL

1. Text: The Physics of Everyday Phenomena: A Conceptual Approach, 7th Edition, Griffith,
2. McGraw-Hill Publishers.
3. Physics 100 Lab Packet, available at instructor's website
4. Calculator: You will need a scientific calculator (nothing fancy) for the homework problems, in-class examples, and laboratory exercises. Please carry it with you to class every day. These can be purchased for about $1-$5.

COURSE CONTENT:

The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

I. Physics and scientific analysis
- A. The scientific method
- B. Scope of physics
- C. Measurement and units
- D. Vectors and scalars

II. Kinematics
- A. Velocity and acceleration
- B. Motion with constant acceleration in one dimension
- C. The acceleration due to gravity and the motion of projectiles
- D. Uniform circular motion and centripetal acceleration
- E. Angular velocity and angular acceleration

III. Dynamics and static's
- A. Newton's laws of motion and the concepts of inertia, mass, and force
- B. The normal force, friction and tension
- C. Newton's law of gravitation and weight
- D. Motion of satellites and planets
- E. Torque and the equilibrium of rigid bodies
- F. Moment of inertia

IV. Conservation laws
- A. Work and kinetic energy
- B. Gravitational potential energy
- C. Conservation of mechanical energy
- D. Power
- E. Impulse and momentum
- F. Conservation of momentum
- G. Center of mass
- H. Conservation of angular momentum

V. Small oscillations and wave motion
- A. Hooke's law, stress, strain, and strength of materials
- B. Simple harmonic motion of the spring-mass system and the simple pendulum
- C. Wavelength, frequency and wave velocity
- D. Transverse and longitudinal waves
- E. Sound waves
- F. Interference and diffraction
- G. Doppler effect

VI. Fluids
- A. Pressure and Pascal's principle
- B. Variation of pressure with height
- C. Archimedes' principle and buoyancy
- D. Types of fluid flow
- E. Equation of continuity and Bernoulli's principle

VII. Thermodynamics
- A. Temperature scales
- B. Thermal expansions of solids and liquids
- C. Heat and specific heat capacity

VIII. Latent heat of fusion and vaporization
- A. Ideal gas laws

B. The first law of thermodynamics
C. Heat engines
D. The second law of thermodynamics

IX. Electric charges and currents
A. Charging by friction and induction Insulators and conductors
B. Coulomb's law
C. Electric field and electric potential
D. Electric current and Ohm's law
E. Series and parallel connections of resistors
F. Electric power
G. Electromotive force
H. Alternating current

X. Magnetism
A. Magnetic field and magnetic lines of force
B. Magnetic force on moving charges and current-carrying wires
C. Magnetic field produced by current-carrying wires

XI. Faraday's law, Lenz law, and magnetic induction
A. Motors and generators
B. Transformers and power transmission
C. Electromagnetic waves and electromagnetic spectrum

XII. Optics
A. Diffuse and specular reflection
B. Spherical mirrors
C. Snell's law of refraction
D. Lenses and prisms
E. The human eye, cameras, microscopes, and telescopes
F. Color
G. Interference and diffraction of light
H. Polarization of light

Student learning outcomes (SLOs)

COMMUNICATION

Students will be able to demonstrate ability to report and/or explain scientific information appropriately.

CRITICAL THINKING

Students will be able to utilize critical thinking skills and the scientific method to solve problems, analyze and interpret data.

TECHNOLOGY AWARENESS

Students will be able to use modern technology to investigate questions.

PERSONAL RESPONSIBILITY

Students will come to class prepared and complete assigned work thoughtfully.

ENVIRONMENTAL RESPONSIBILITY

Students will be able to explain or describe the impact of the physical sciences on the environment.

STUDENT RESPONSIBILITIES:

Students must come to class on time and be prepared. This means remembering to bring your homework, your lab report if due, your textbook, a calculator, a notebook, and your lab manual as well as reading the assigned chapter sections and preparing for lab. By being prepared, our time together in class will be far more productive. Physics is a challenging course. To succeed, you need to spend AT LEAST 8 hours per week reading the text, doing homework problems and questions, preparing for lecture and lab, writing lab reports, organizing notes, and studying for the 4 exams. Physics is also an active discipline. You learn by doing: reading and thinking about the material, solving problems and answering questions, and making measurements and calculations.

Tips for Success:

Come to class on time and **be prepared.** By reading or skimming the upcoming material before the class, you will be able to focus on the implications and applications of the material instead of trying to figure out what those unfamiliar symbols and equations mean. Start the homework problems early. By reading carefully each homework problem, interpreting what is explicitly and implicitly given, drawing a picture of the problem and defining directions or coordinates, your sub conscience mind will take over the problem even if you can not start the problem. The idea of how to start the problem may pop into your mind later. Another problem, a question in class, or something that you read or do may stimulate your mind to figure out how to approach the problem. The more lead time you have, the greater the probability that you will eventually see how to start the problem. Start your lab write-up early. This will afford you the chance to ask questions or get help if you need it. **Read all test problems carefully!** Students often know the material but do not carefully interpret the problem or they do not answer the question asked. **Relax and have fun**! It is easier to think clearly when you are not tense. Be patient. Physics can be challenging at times but if you stick with it, you will succeed!

Grading:	Best 3 of	4 Exams:	50%
		Homework:	10%
		Labs: 30%	
		Participation:	10%
		TOTAL	100%

There is not a separate grade for labs

Your final course letter grade will be determined as follows:	90 to 100%
	80 to 89%
	70 to 79%
	60 to 69%
	Under 60%

Policy Regarding Late Work:

All assignments are due at the *beginning* of class. It is extremely disrupting and disrespectful to other students and the instructor if you walk up to the front of the room to hand in your lab report or homework late while a discussion is going on. Late lab reports may be accepted for full credit only on the day following their due date under extreme special circumstances; illness, family emergencies, and the like

Attendance and Add/Drop Policy:

It is important that you attend class on a regular basis. If you wish to drop yourself from the class, don't forget to do that by the deadline, otherwise a letter grade (A through F) must be issued to you. It is *your responsibility* to add, drop, or withdraw from classes before the deadlines stated in the class schedule. Any student accumulating unexcused absences that exceed 6% of the total class sessions **may** be dropped. Tardiness and leaving class early **may** be considered as unexcused absences. There are about 90 hours of instruction (class and lab) so to miss 6% would be to miss 6 hours of instruction. If you miss class, please make arrangements with a classmate to keep you informed on lecture topics and homework assignments.

Students should consult with the instructor before dropping the course.

Classroom Behavior:

Since you are all responsible adults, you are expected to respect and obey standards of student conduct while in class and on campus. The Student Code of Conduct, disciplinary procedure, and student due process (Policy 3100, 3100.1 and 3100.2) can be found in the current college catalog in the section Academic Information and Regulations pages 39-51, and at the office of the Dean of Students Affairs (H-500). Please turn off all radios, pagers, cell phones, or other devices that distract the class.

Academic Dishonesty:

The class will be conducted in accordance with the Mesa College student code of conduct and basic standards of academic honesty. Cheating, plagiarism, and other forms of academic dishonesty are not acceptable and will not be tolerated. Cheating includes, but is not limited to the following: bringing into the classroom any notes of any form that you intend to use on the exam which are not allowed, looking in the direction of another students' paper, changing anything on the exam after it has been graded and handed back to you. In addition, violations of standards of academic honesty will be reported to the college disciplinary office for appropriate action.

Accommodation of Disabilities:

If you have a disability (medical, physical, or academic) and need academic accommodations, please notify me within the first two weeks of class.

Week starting	Lecture topics/ Labs Tentative Schedule	Chapters
08/18/14	Introduction, units, significant figures, Scientific notation, kinematics **Lab: Introduction**	1,2
08/25/14	Kinematics, Free fall **Lab: Measurement of "g"**	2
09/01/14	Holiday, projectile Motion, **Lab: Holiday**	3

09/08/14	Newton's laws of motion **Lab: Projectile Motion**	4
09/15/14	Review, Circular Motion, Gravitation **Lab: Exam 1 chapters 1-5**	5
09/22/14	Work and energy conservation **Lab: Conservation of Mechanical Energy**	6
09/29/14	Momentum and Impulse **Lab: Conservation of Momentum**	7
10/06/14	Rotational Motion **Lab: Torque and Static Equilibrium**	8
10/13/14	Review, Static and Dynamic Fluids **Lab: Exam 2 chapters 6-8**	9
10/20/14	Fluids, Temperature, Heat **Lab: Buoyancy**	9,10
10/27/14	Engines, refrigerators, static electricity, electric field **Lab: Specific Heat**	11,12
11/03/14	Review, work, Circuits **Lab: Exam 3 chapters 9-12**	12,13
11/10/14	Magnetism **Lab: Holiday**	13,14
11/17/14	Electromagnetism, Transformers, Waves **Lab: Velocity of Sound**	14,15
12/01/14	E/m waves, optics **Lab: Reflection/Refraction**	16,17
12/08/14	Review **Lab: Exam 4 Chapters 13-17 During Wed./Thurs. Lecture**	
12/15/14	TBA	