KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

DEPARTMENT OF PHYSICS

Physics 101 - General Physics I
Fall 2019 (Term 191)

Course Description:

The topics covered include particle kinematics and dynamics; conservation of energy and linear momentum; rotational kinematics; rigid body dynamics; conservation of angular momentum; Gravitation; simple harmonic motion; the static and dynamics of fluids.

Co-requisite: MATH 101

Textbook:

"Principles of Physics", by Halliday, Resnick and Walker, **Tenth Edition**, John Wiley & Sons, Inc (2014).

Teaching Method:

The course material will be presented in *lectures* (3 hrs. per week). Problem solving techniques will be shown in *recitations* (1 hr. per week). The understanding of concepts learned in the lectures will be strengthened by *laboratory work* (3 hrs. per week). **All classes (lectures and recitation) will start from the first week**. **Labs will start from week #2 only.** Office hours (OH) of the instructors may better be utilized for clarifying the course material and developing problem solving skills on a regular basis. Please see the master list of OH for identifying the instructor who is available at a particular time.

Course Learning Outcomes: On successfully completing the course the students can:

1. Solve kinematic problems involving motion of a point particle in one, two, and three dimensions including vector operations with an overall average of 50% in exams.
2. Formulate and apply Newton's laws that govern the mechanics of a point particle and score an average of 55% in exams.
3. Understand the concepts of mechanical energy and linear momentum and apply their conservation laws to analyze simple mechanical systems with an average of 50% in exams.
4. Solve kinematic and dynamic problems involving rotation of a rigid body about a fixed axis and smooth rolling motion and score an average of 50% in exams.
5. Extend the rules of basic mechanics of translational motion to circular and orbital motions and score an average of 55% in exams.
6. Solve problems related to static equilibrium of extended bodies under the action of forces and/or torques and score an average of 55% in exams.
7. Analyze and solve basic static and dynamic fluid problems and score an average of 55% in exams.
8. Explain the oscillatory motion in one and two dimensions and solve problems for simple mechanical systems and score an average of 50% in exams.
9. Operate basic Laboratory equipment, collect and plot data, write results and draw conclusions in a concise report and score an average of 70% in lab grade.

Attendance Policy:

1. A **DN** grade shall be given to the student who has 3 or more unexcused absences in the LAB.
2. A **DN** grade shall be given to the student who has more than 12 unexcused absences in lecture + recitations,
3. A **W** grade will be given to the student whose total absences (excused and unexcused) is more than 20 absences. To get this grade, the unexcused absences should be less than 13. Otherwise the student will get a **DN** grade.
4. A Student who has a valid excuse (from KFUPM clinic or Students Affairs) for his absence must present it to his instructor no later than one week following his resumption to the classes.

Assessment:

Grading Policy	%
Class Work	10
Lab Work	20
Exam I	20
Exam II	20
Final Exam	30
Total	**100**

Letter Grades Distribution	
$A^+ \geq 80$	$53 \leq C < 60$
$77 \leq A < 80$	$47 \leq D^+ < 53$
$73 \leq B^+ < 77$	$41 \leq D < 47$
$67 \leq B < 73$	$F < 41$
$60 \leq C^+ < 67$	

a) **Class work** (with average score 6.0/10):
The class score shall be derived from student's performance in quizzes/class test.

b) **Lab work** (with average score 14.0/20.0):
The lab score shall be derived from a combination of lab reports/quizzes, and lab final exam.

c) **Exams**:
All exams will be of multiple-choice type. A sheet of important formulae (not definitions) will be provided in all exams.

d) **Upgrade**:
A student who has 5 absences or less in the whole semester will be promoted to the next higher letter grade (for example from F to D or B to B+ etc.) only if his total score is one mark or less from the higher letter grade.

Make-up Exam Policy:

A student who misses an exam with a valid excuse must present an officially authorized document to the course coordinator within 3 days after the date of the exam in order to take a make-up exam. However, if misses the Final Exam with a valid excuse he will get an "IC" grade in the course and will take make-up exam in the following semester. If he does not have a valid excuse, the score for that exam will be zero. Personal excuses are not accepted.

Physics 101 Lecture Schedule - Fall 2019 (Term 191)

Week	Date	Topics	Chapter	Sec	Useful Links
1	01 Sep	Units, Changing units, Significant Figures	01	1	Sig. Figures 1
	03	Length, time, mass (powers of ten), Dimensional Analysis	01	2,3	
	05	1-D motion, Displacement, Velocity and acceleration	02	1-3	Acceleration 1
2	08	Constant acceleration, Free fall, Graphical Integration	02	4-6	
	10	Vectors and Their components. Adding Vectors	03	1,2	Components 1
	12	Multiplying Vectors	03	3	Adding 1
Thursday – 12 Sep. 2019- Last day for dropping courses without permanent record					
3	15	2D & 3D motion with constant acceleration.	04	1-3	Displacement 1
	17	Projectile motion (Demo #1) , Uniform Circular Motion	04	4,5	Projectile1,2
	19	Relative Motion in 1D and 2D	04	6,7	Circular 1, 2
4	22	**National Day Holiday**	---	---	
	24	**Review**	---	---	
	26	Newton's first and second laws, FBD	05	1	Gravity 1
5	29 Sep	Some particular forces, Newton's third law	05	2	Ramp 1
	01 Oct	Applications	05	3	Friction 1
	03	Friction, (Demo #2)	06	1	
6	06	Uniform Circular Motion	06	3	Circular 2, 3
	08	**Review**	---	---	
	10	**Review**	---	---	
Thursday- 10 Oct. 2019 - Last day for dropping courses with grade of "W" thru KFUPM Portal					
First Exam (Chapters 1 – 6): Thursday Oct 10th 2019 (Bldg. 57 & 59, specific exam halls TBA and 5:30 – 7:30 pm)					
7	13	Kinetic Energy and Work	07	1-3	Spring 1
	15	Work done by Weight, *Spring*, power	07	4,6	
	17	Potential energy , Conservation of Mechanical Energy	08	1,2	Pendulum 1
8	20	Work by an External Force, Conservation of energy	08	4,5	
	22	Center of mass, Newton's second law for a system of particles	09	1,2	COM 1
	24	Linear momentum and impulse	09	3,4	
9	27	Conservation of Linear momentum, Kinetic Energy in Collisions	09	5,6	Conservation 1
	29	Collisions in 1-D and 2-D	09	7,8	Collisions 1
	31	Rotational motion , Rotational Variables	10	1-3	
10	03 Nov	Kinetic Energy and Rotational Inertia	10	4,5	
	05	Torque and Work in Rotational Motion	10	6-8	Torque 1
	07	Rolling, Forces and Kinetic Energy of Rolling	11	1-3	
Thursday 07 Nov. 2019: Last day for withdrawal from all courses with grade of "W"					
11	10	Torque and Angular momentum	11	4-6	Rolling 1
	12	Conservation of angular momentum (Demo # 6)	11	7,8	Ang. Mom. 1
	14	**Review**	---	---	
12	17	**Review**	---	---	
	19	Equilibrium, Examples of Static Equilibrium	12	1,2	Young Modulus1
	21	Elasticity	12	3	Shear Modulus 1
Second Exam (Chapters 7-11): Monday Nov. 18th 2019 (Bldg. 54 and 8:00 – 10:00 pm)					
13	24	Newton's law of Gravitation	13	1-3	
	26	Gravitation Inside Earth, Gravitational-potential energy	13	4,5	
	28	Kepler's laws, Satellites	13	6,7	Kepler 1
14	01 Dec	Fluids at Rest	14	1-3	
	03	Pascal's Principles, Archimedes Principle.	14	4,5	Buoyancy1
	05	The Continuity Equation, Bernoulli's equation	14	6,7	Bernoulli 1
Thursday - 05 Dec 2019: Last day for withdrawal from all courses with grade of WP/WF					
15	08	Oscillations, Simple Harmonic Motion (SHM), Energy in SHM	15	1,2	
	10	Pendulums, The Physical Pendulum	15	4	Pendulum 1
	12	**Review**	----	----	
	15	**Review**	-----	----	
	16	**Last day of classes**			
Final Exam (Chapters 1 – 15): Saturday Dec 21st 2019 (8:00 am morning)					
Wish you a successful semester.			Dr. Watheq Al-Basheer (*Physics 101- Coordinator*)		