Syllabus for
PHYS191: Physics I – Mechanics
Department of Physics of the Petroleum Institute

4 credit hours
6 contact hours (3 hours lecture, 3 hours laboratory)

Textbook: *Fundamentals of Physics (8th Ed.)*; Halliday D, Resnick R and Walker J; John Wiley & Sons (2007), chapters 1-12,15-17.

Lecturers:	***Dr Curtis Bradley***	***Dr Kevin Dean****
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*course coordinator

Catalog description: This is a first university course in physics that covers the basic principles of mechanics using vectors and calculus. The fundamental concepts are presented as well as applications of kinematics and kinetics of particles and solid bodies, including Newton's Laws, energy and momentum principles, oscillations and waves.

Pre- and co-requisites:
Pre-requisite: MATH111. Co-requisites: MATH161, PHYS191Lab

Physics 191 is a required course for all degrees at the Petroleum Institute.

Specific Goals for the Course: Students will be able to:
1. a) demonstrate basic understanding of physics concepts and reasoning skills, b) apply fundamental definitions and equations, and c) use concepts, skills, definitions, and equations to analyze typical but un-rehearsed problems.
2. collect and analyze data, create graphs and fitted lines to graphed data, and make reasoned comparisons of results with other results, models or theoretical formulae.

Target Schedule & Topics Listing:	**Approx Timing**
Measurement; International System of Units, unit conversions	Week 1
Particle Motion; constant acceleration, free-fall motion, vector representation, 2D projectiles, introduction to vectors	Weeks 1-2
Forces; Newton's laws of motion, friction, fluid drag, terminal velocity, uniform circular motion	Weeks 3-4
Energy; work, kinetic and potential energy, power, conservative and non-conservative forces, energy conservation	Weeks 5-6
Momentum and Impulse; center of mass, particle systems, impulse, conservation of linear momentum, 1D and 2D collisions, elastic and inelastic collisions	Weeks 7-9
Rotation of Rigid Bodies; rotational kinematics, inertia and torque, angular momentum	Weeks 9-11

Equilibrium; equilibrium requirements, center of gravity	Weeks 11
Oscillations; simple harmonic motion, damped and forced vibrations, resonance	Weeks 12-13
Waves; transverse and longitudinal waves, energy and power, wave superposition, interference, standing waves	Weeks 14-16

Assessment: The grade and credit for this course is determined from points earned from lab activities, assignments, quizzes/tests, and exams, using the following scheme:

Letter grade	results by earning
A	90.0% or above
A-	87.5% to 90.0%
B+	82.5% to 87.5%
B	80.0% to 82.5%
B-	77.5% to 80.0%
C+	72.5% to 77.5%
C	70.0% to 72.5%
C-	67.5% to 70.0%
D	60.0% to 67.5%
F	below 60.0%

of course points

Distribution of Course Points:

Attendance	4%
Activities/Quizzes	10%
Tests	16%
Laboratory Expts.	20%
Laboratory Exam	5%
Mid-Term Exam	15%
Final Exam	30%

The following important notes apply:

Note 1: A score of 40% or less on the final exam paper earns an overall F course grade.

Note 2: If a quiz or test is missed and a documented excuse issued by the Student Affairs department is provided to explain the absence, then the final exam mark will be used for the missing item. Otherwise, the item's score is zero.

Note 3: The single lowest quiz mark will be dropped from the quiz average.

Attendance Policy: Students earn the full 4% with up to ten absences. This credit decreases 0.5% per absence in excess of ten. Zero credit is earned for any missed in-class activities. Missed quizzes or tests are discussed in Note 2, above. A missed lab earns a zero unless a make-up is arranged with the lab instructor.

Emergency Evacuation: In case of an emergency or a fire alarm during a class, all students must follow the directions of the class/laboratory instructor and evacuate the room in an orderly manner to the assembly area. Failure to do so is a violation of PI's HSE Policy on emergency evacuation and will be subject to disciplinary action.

Academic Integrity: The instructor and students are bound by the institute's Academic Integrity Policy. Major pieces of student work will include the *Honor Pledge*: "I pledge that I have neither given nor received any unauthorized assistance on this assignment, exercise, or examination. If an instructor suspects that a student has committed an academic offense, the instructor must (1) confront the student, (2) make a determination, and (3) respond to the offence. If the student admits to the offence the instructor must impose a sanction and report the occurrence to the Academic Honor Council.