Course Information:

Course Title:	Newtonian Mechanics for Students in Engineering and Science
Course Number:	PHYS 206 (THECB common course number: PHYS 2325)
Credit Hours:	3 SCH (3 lecture plus 1 recitation)
Term and Section:	XX
Meeting times and location:	XX
Pre-requisites:	Grade of C or better for MATH 151 or MATH 171 or equivalent.
Co-requisites:	PHYS 216/ENGR 216

Instructor Information:

Instructor:	XX
Telephone:	XX
Email:	XX
Office:	XX
Office hours:	XX

Course Description:
A calculus-based course on introductory Newtonian mechanics. This is the first semester of a two-semester sequence in introductory physics for students in Science and Engineering. By the end of the course students will understand, describe and apply the laws of physical motion to the solution of science and engineering problems.

Required Materials:

Primary text	University Physics (Volume 1) by Young and Freedman, 14th ed., with Modern Physics for Modified Mastering. ISBN13: 9781323128596.
Homework (Mastering)	All 206 sections use the ModifiedMastering on-line homework system.
Clicker	Get the iClicker2 from your bookstore. The iClickers will be used for in-class conceptual testing and polling. To encourage class participation, credit for iClickers will be based in part on participation, as well as additional points based on correct answers.
Pre-Lectures (FlipItPhysics)	All 206 sections use the http://www.flipitphysics.com on-line pre-lecture system (formerly known as SmartPhysics). You are required to view the prelectures (narrated slides including a few online questions) ahead of the lectures, and the lectures will include quizzes to see if you have gained a basic understanding. The remainder of the lecture will then focus more on problem-solving.

Grading Policies:
Exams: there will be 4 common evening exams (3 “midterm” exams and 1 “comprehensive” exam). Each of these will be given in the evenings as listed in the course schedule during the registration procedure: date1, date2, date3, date4. The midterm exams start at or around 7:30 PM, and are expected to last 1.5 hours. The comprehensive exam will last 2 hours. Exams generally consist of problems similar in content and difficulty to the recitations or homework, and they are

expected to include both multiple-choice and free response questions. Students only need to bring their TAMU ID, a pen/pencil and hand-held calculator. Any contestations regarding the grading of an exam must be brought to the instructor's attention within 1 week of them being returned to the student.

Absences: If you miss an exam due to an *authorized excused absence* as outlined in the *University Regulations, Student Rule 7: http://student-rules.tamu.edu/rule07*. Rule 7.1.6.2a is not acceptable. You should attempt to ***contact the instructor prior to the exam but no later than the end of the week of the missed exam*** to arrange for a way to make up the score. Instead of taking a make-up exam, the final cumulative exam grade will be based on a set of tested objectives in the other exams.

Note: Few conditions qualify as an authorized excused absence, so you must avoid missing exams except for extremely serious circumstances.

Course Grade: The final letter grade on the course is based upon the final numerical course score as detailed in the table below. The column on the left shows the minimum scores necessary to achieve the final letter grade show in the right column.

Course Score	Final Letter Grade
≥ 90 %	A
≥ 80 %	B
≥ 65 %	C
≥ 50 %	D
< 50 %	F

The numerical score is computed as a weighted average over all different components of the course with the weights as determined in the table below. With the exception of the clicker quizzes all components of the course, such as tests/labs/recitation/homework/etc, are common across all sections of PHYS 206.

Course Component	Weight
Exams (Three Midterms + Comprehensive one)	80%
Recitation	5%
Online homework	5%
Pre-lectures and Checkpoints	5%
In-class clicker quizzes	5%
Total:	100%

The "Exams" portion includes the three midterm exams as well as the comprehensive one. Exams are graded in terms of the learning objectives. This type of grading removes the multiple punishment that is associated with failing the same learning objective repeatedly across exams. The complete list of learning objectives that a student is supposed to master at the end of the semester is posted at physics206.physics.tamu.edu/los.html

Each exam tests several different learning objectives and could test many times the same learning objective. During the grading we keep track of every instance in which a learning objective is tested and whether in that particular instance the objective was marked as passed or failed. Learning objectives will also be tested multiple times across exams.

At the end of the semester we call achieved objectives as those who pass either one of the criteria below:

- were marked as passing **≥60%** of the tested times in the comprehensive exam.
- were marked as passing **≥60%** of the tested times in all exams in which they were tested, including the comprehensive one.

The number of achieved objectives at the end of the semester divided by the number of tested objectives gives the numerical grade in the "Exams" portion of the table above**.** As an example, if a student has achieved 60 objectives out of the total of 70 objectives tested, he/she has earned 86% of the Exams portion of the course grade.

Mode of Instruction:

This course is composed of several pedagogical elements to enhance instruction through peer-learning and visual aids as described below:

- **Prelectures:** short online pre-lectures to expose the students to professionally designed videos explaining the basic concepts for the first time and gathering student- feedback on what might not be understood from them.
- **Lectures:** flipped classroom lectures in which a brief review of the concepts is done targeting the feedback on the pre-lectures, followed by the application of the physics concept to everyday life and the solution of problems. The lectures take advantage of clicker quizzes (usually solved in group) to obtain instant feedback on the level of grasp of the different concepts.
- **Recitations:** carried in groups and led by a group of trained TA's and teaching fellows. Teaching fellows are typically engineering students that have pass the course recently with excellent grades and provide a fundamental peer-learning component to this course.
- **Homework:** individual online homework assignments.

Students should plan for three hours of preparation per credit hour each week of the term.

Student-Instructor Interaction:

A website common to all sections of the course is the main source of general information. Grades and information specific to the sections will be held in eCampus. The lecture instructor, the TAs and Teaching Fellows will host office hours and Q&A sessions.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Aggie Honor Code

"An Aggie does not lie, cheat or steal, or tolerate those who do." For additional information, please visit http://aggiehonor.tamu.edu.

Course Topics and Calendar of Activities:

Week	Lecture topic
1.	Introduction and math review
2.	Units, measurements and vectors
3.	Motion along a straight line
4.	Motion in 2 and 3 dimensions. **Exam 1.**
5.	Newton's laws of motion
6.	Applying Newton's laws
7.	Work and kinetic energy
8.	Potential energy and energy conservation. **Exam 2.**
9.	Centre of mass, momentum and collisions
10.	Rotation of rigid bodies, moments of inertia
11.	Torque and rotational dynamics
12.	Conservation of angular momentum, static equilibrium. **Exam 3.**
13.	Gravitation, satellite motion and Kepler's laws
14.	Simple harmonic motion, pendula. **Final.**

Learning Objectives:

Conceptual knowledge to gain:

- Understanding of the physical laws of motion, static and dynamical Newtonian mechanics, and harmonic motion.
- To think more critically/scientifically, and develop the skills need to solve difficult multi-step problems.

Upon successful completion of this course, students will be able to:

- Be able to produce a mathematical description of movement in 1, 2, and 3 dimensions.
- Transform positions, velocities, and accelerations from one coordinate system to another system in relative motion with respect to the first one.
- Identify a basic set of forces, their origin, and their points of application in specific problems.
- Identify and isolate bodies and pictorially represent the direction and location of forces acting on the bodies.
- Compute the position of the center of mass and moment of inertia for different basic shapes in simple conditions.
- Application of the Laws of Newton to quantitative predict linear and rotational movement.
- Application of conservation laws to quantitative describe linear and rotational movement.
- Computation of forces in problems of statics.
- Identification of systems undergoing Simple Harmonic Motion, description of that movement and computation of their frequencies of oscillation.