SYLLABUS – PHYSICS 206 - UP: Mechanics
Fall 2019

Course Information:

Course Title:	Newtonian Mechanics for Engineering and Science
Course Number:	PHYS 206 (THECB common course number: PHYS 2325)
Credit Hours:	3 SCH (3 lectures plus 1 recitation)
Term and Sections:	Fall 2019, 531–536 and 543–548
Lecture Times and Location:	Tuesdays and Thursdays, 9:35–10:50 am, MPHY 203 (sections 531—536) Mondays and Wednesdays, 4:10—5:25pm, MPHY 203 (sections 543—548)

Instructor Information:

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Office hours:	Tuesdays and Thursdays, 1:00 – 2:30 pm

Course Web Pages:

- **mechanics.physics.tamu.edu** – website with information common to all PHYS 206 sections using the '*Physics for Scientists and Engineers*' textbook.
- **ecampus.tamu.edu** – site for this class will have lecture notes and grades, and to sign up for Sapling Learning.
- **www.saplinglearning.com** – the online system for homework submission, and to view pre-lectures with follow-up bridge assignments (register through ecampus.tamu.edu).
- **freshman.physics.tamu.edu/p218** – to check your status on achieved learning objectives.

Pre-Requisite: **MATH 151 or 171**.

You must have a working knowledge of plane geometry, trigonometry, and algebra. As the semester progresses you will also be expected to have a working knowledge of derivatives and integrals, and be proficient in the use of vectors (addition, subtraction, dot and cross products).

Course Description:

This is a calculus-based course on introductory Newtonian mechanics. It is the first semester of a two-semester sequence in introductory physics primarily intended for students pursuing degrees in STEM fields. 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.

Learning Outcomes:

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 needed to solve difficult multi-step problems.

Upon successful completion of this course, students will 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.
- Apply Newton's Laws to quantitatively predict linear and rotational motion.
- Apply conservation laws to quantitatively describe linear and rotational motion.
- Understand the conditions for static equilibrium and quantitatively deduce the forces involved.
- Identify systems undergoing simple harmonic motion, describe that movement, and compute the frequencies of oscillation.

Text and required materials:

Primary text	***Physics for Scientists and Engineers*, by Mosca and Tipler, Vol. 1, 6th edition**, published by MacMillan. The TAMU bookstore has a custom package (ISBN: 978-1319334420) for $80 (your cheapest option) which is a loose-leaf version with access to the eBook and Sapling Learning for one semester. If you buy the textbook elsewhere without access to Sapling Learning, you may purchase access online.
Homework (Sapling Learning)	All PHYS 206-UP sections use the Sapling Learning system for the on-line homework. **You do <u>not</u> need a course access code**; you should go to eCampus, login with your NetID and password, and click the link on the left menu under "Sapling Learning", which will be linked with the correct course automatically.
Clicker	In-class participation and conceptual testing will be made using the iClicker system. The iClicker Cloud (formerly "REEF polling") using smartphones or laptops will not be enabled. To encourage class participation, credit for iClickers will be partly based on simply answering regardless of whether it is the correct answer or not. To gain participation credit you must pre-register your device (this will be explained in the first week of classes), and answer all of the questions in class. *Cheating by bringing a friend's clicker is a violation of the Aggie Honor Code, and will result in loss of all clicker points, and disciplinary action.* Please direct all technical issues with the support team at iclicker.com.
Pre-Lectures (Sapling Learning)	You are required to view the pre-lecture videos prior to attending lectures to help prepare you for what we will cover in class. There are also follow-up "bridge assignments" which are short quizzes on the pre-lecture material to check that you have gained a basic understanding of what was covered in the pre-lectures.
Calculators	You will need a calculator for the homework, but calculators will **not** be allowed for the midterms or the comprehensive exam. Exams will be a mix of purely symbolic and numerical questions, where only simple arithmetic will be needed.

Recitations: Information regarding the format and grading of the recitations may be found on the common webpage at http://mechanics.physics.tamu.edu/recitations.shtml. Note that you must attend the recitation each week. The policy for absences in recitations is the same as for the exams, and you must first consult with your TA in the case that you have an excused absence.

Homework: The weekly online homework assignments may be accessed from within eCampus, or directly from Sapling Learning **after** registering through eCampus. You are responsible for completing and understanding these problems in preparation for the exams. By the end of the first week you should complete the first homework assignment.

You must work the online problems on your own, and keep up with the weekly deadlines — see the calendar on the Sapling Learning site for posted due dates. Late submissions **are** accepted; however full credit will not be given. The penalty is 10% per day after the deadline. You have 10 attempts to get the correct answer for each question, with a 3% penalty for each incorrect response. You will be able to see the solution only after the due date for a given problem set has passed.

Exams: We will have 3 midterm exams and one comprehensive exam, all of which are common to all PHYS 206 sections. Each of these will be given in the evenings as listed in the course schedule when you registered: Monday Sep. 23, Monday Oct. 21, Monday Nov. 11 and Monday Nov. 25. The midterm exams start at or around 7:30 pm, and are expected to last 1.5 hours. The comprehensive exam is the Monday before finals week and will last **3 hours**. Exams generally consist of problems similar in content and difficulty to the homework, and they are expected to include both short-answer and free-response questions. Formula sheets will be provided for each exam. You only need to bring your TAMU ID and a pen/pencil. Calculators are *not* allowed. Any contestations regarding the grading of an exam must be brought to my attention within **1 week** of their being returned to you.

Absences: If you miss an exam due to an **authorized excused absence** as outlined in the University Regulations, Rule 7 (http://student-rules.tamu.edu/rule07; note that Rule 7.1.6.2a will not be accepted), you should attempt to **contact me prior to the exam but no later than the end of the week of the missed exam**. A make-up exam will only be offered if you miss the comprehensive exam due to a university-excused absence. If you miss a non-comprehensive midterm exam due to an excused absence, your final cumulative exam grade will be based on the set of tested objectives in the other exams (including the comprehensive exam). **Note:** Few conditions qualify as an authorized excused absence, so you must avoid missing exams except for extremely serious circumstances.

Identification: You *must* bring your TAMU student ID with you to all exams for identification purposes.

Course Grade: The final letter grade on the course is based upon the final numerical course score as detailed in the table below:

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

The numerical score (left column) is computed as a weighted average over all the different components of the course, with the weights as specified in the table below. With the exception of the clicker quizzes, all components of the course (*i.e.* the exams, recitations, homework and pre-lectures) are common across all sections of 206-UP.

Course Component	Fraction of final grade
Exams (three midterms + the comprehensive exam)	80%
Recitations	5%
Online homework	5%
Pre-lectures and bridge assignments	5%
In-class clicker quizzes	5%
Total:	100%

The "Exams" portion includes the three midterm exams as well as the comprehensive exam. Exams are graded in terms of learning objectives. The complete list of learning objectives that a student is supposed to master by the end of the semester is posted at mechanics.physics.tamu.edu/los.html.

Each exam tests several different learning objectives and could test the same learning objective multiple times. 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. You may view your status on your achieved learning objectives throughout the semester by logging on with your NetID at https://freshman.physics.tamu.edu/p218.

At the end of the semester we call achieved objectives as those who pass either 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 exam.

The fraction of achieved objectives at the end of the semester out of 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 43 objectives out of the total of 50 objectives tested, he/she has earned 86% of the exams portion of the course grade.

Course Topics and Calendar of Activities:

Week	Lecture Topic
1	Units, measurements and vectors
2	Motion along a straight line
3	Motion in 2 and 3 dimensions **Exam I covers topics up to and including this week**
4	Newton's laws of motion
5	Applying Newton's laws
6	Work and kinetic energy
7	Potential energy and energy conservation **Exam II covers topics up to and including this week**
8	Centre of mass, momentum and collisions
9	Rotation of rigid bodies, moments of inertia
10	Torque, rotational dynamics and angular momentum
11	Static equilibrium **Exam III covers topics up to and including this week**
12	Gravitation, satellite motion and Kepler's laws
13	Simple harmonic motion, pendula **The comprehensive exam covers topics up to and including this week**
14	Mechanical Waves

Americans with Disabilities Act (ADA) Policy Statement: 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 Disability Services website at http://disability.tamu.edu. All information and documentation concerning a disability is kept confidential.

Academic Integrity Statement and Policy: The Aggie Honor Code states, *"An Aggie does not lie, cheat or steal, or tolerate those who do."* Further information regarding the Honor Council Rules and Procedures may be found on the web at http://aggiehonor.tamu.edu.

Title IX and Statement on Limits to Confidentiality: Texas A&M University and the College of Science are committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws provide guidance for achieving such an environment. Although class materials are generally considered confidential pursuant to student record policies and laws, University employees – including instructors – cannot maintain confidentiality when it conflicts with their responsibility to report certain issues that jeopardize the health and safety of our community. As the instructor, I must report (per Texas A&M System Regulation 08.01.01) the following information to other University offices if you share it with me, even if you do not want the disclosed information to be shared:

- Allegations of sexual assault, sexual discrimination, or sexual harassment when they involve TAMU students, faculty, or staff, or third parties visiting campus.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In many cases, it will be your decision whether or not you wish to speak with that individual. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the Student Counseling Service (https://scs.tamu.edu). Students and faculty can report non-emergency behavior that causes them to be concerned at http://tellsomebody.tamu.edu.