Physics 5200 **Classical Mechanics I** **Fall 2019**

Lectures: M,W,F 2:30-3:20 **ROOM:** Manoogian Hall 0263

Pre- and Co-requisites: PHY2170 and PHY2180 are pre-requisites, PHY5100 or equivalent is co-requisite.

Course Materials:
Textbook: John R. Taylor, "Classical Mechanics"
University Science Books, (2005); ISBN 1-891389-22-X

Lecturer: W.J. Llope, Associate Professor
Physics Building, Room 347
wjllope@wayne.edu
313-577-9805

Course Webpage: WSU Canvas

Office Hours: (tentative) M: 1:00 PM - 2:00 PM or by appointment

LEARNING OUTCOMES: The goal of this class is for you to understand of the principles and concepts of Classical Mechanics, the first branch of Physics upon which all others are built. This branch studies of the motion of bodies in accordance with the general principles first enunciated by Sir Isaac Newton in his Philosophiae Naturalis Principia Mathematica (1687). You will develop the ability to critically read and understand scientific text describing the principles of Classical Mechanics. You will use that understanding to solve problems concerning the non-relativistic motion of rigid bodies.

LECTURES: These are given three times a week. These will consist of lecturing at a whiteboard, group discussions, and group problem solving. There may be the occasional in-class quiz, perhaps without warning! Attendance and active participation in the class is explicitly graded and will form part of your final grade for this class, as described below.

The lectures, and also Canvas, will be used to distribute announcements and to discuss the upcoming course schedule. Canvas announcements should appear as emails sent to your WSU e-mail address. **Some of these messages could be important or urgent, so make sure you check this email account regularly, or set up forwarding from your WSU account to your preferred account.** These emails will have a standard Subject line format which is handy for highlighting these messages, putting into a special folder, etc. Ensure that these messages are not going into your Junk mail folder!

HOMEWORK: Some number of problems from the textbook will be assigned periodically and will be handed in and then graded. These assignments are obviously intended to evaluate your understanding of the material, but they also force you to keep pace with

the class. You will find it much easier to prepare for the exams if you have been putting in the work every week!

Note you will need to put in *at least* several hours **per week** on the material besides the time we spend together in the lectures. It is highly recommended that you **work all odd-numbered problems from the book** as the course proceeds and check your work against the answers at the end of each chapter.

Please also note that the work you hand in must be *neatly written* on plain paper and stapled beforehand if necessary. Your homework submissions are a reflection of your effort. Unreadable stacks of scribble on ratty spiral ring paper is a pain to read and grade. You have been warned!

Intermediate and final answers should be circled and the appropriate units should always be provided. You are always encouraged to include neat and readable sketches of the problem indicating the coordinate axes chosen, vector directions, and the like.

EXAMS: There will be three 50-minute exams in class during normal lecture periods. In these exams, you will be asked questions about the recent material which may be conceptual or may require problem-solving. The tentative dates for these exams is listed below, but these are of course subject to change.

The lowest regular exam score will be replaced by your score on the Final Exam (if the final exam score exceeds the lowest regular exam score). Therefore, **no makeup exams will be given.**

The date and time of the Final Exam is scheduled by the registrar's office cannot be moved to a different day or time. If you will have three or more final exams to take on the same day as our final exam, please see the lecturer to discuss options.

During an exam, no electronic devices other than a calculator are allowed in the room (no iPods, headphones, cell-phones, Blackberries, etc.) Bring pencils of course. A graphing calculator is fine.

You may also bring in a single page (one side) equation sheet for each exam. You will hand in each equation sheet when you hand in the exam, and the equation sheets will be returned to you after that exam. You will be allowed to bring all three midterm exam equation sheets to the final exam.

Exams *may* be graded on a curve. I will decide this based on the average exam score. If the average score is above 65%, the scores will not be curved. If the exam scores are curved, the algorithm that will be used sets the mean to a score of 70 (B−/C+) with a linear re-weighting such that no one exceeds 100%. Curving the exam scores only makes sense for small adjustments as stronger students benefit less than weaker students. Thus,

curving scores effectively penalizes the good students, so I will curve the exam scores only if it is truly necessary. You should assume in general that the exam scores will not be curved. The mean value of the (uncurved or curved) scores will be distributed to the class so you can see if you doing poorly or well with respect to your peers.

COURSE GRADING: Your course grade will be determined by your performance in the different aspects of the class. Several items contribute to your total Course Score, in percent and totalling 100%, as detailed in the table below.

The "Lectures" item is based on attendence to the lectures, paying attention during them (no cell phone use, being active in the discussions), and attitude and activity during any in-class small-group problem solving. The Final Exam will cover the material presented throughout the entire semester. With the possibility of extra credit (in the homework, exams, or lectures), your percentages could exceed the totals in the table.

Item	Course Score (%)
Three In-class Exams	45% (15%×3=45%)
Final Exam	25%
Homework	20%
Lectures	10%
Total	**100%**

The letter grade for the course will be based on the following scale (WSU default).

Grade	Course Score	Grade	Course Score
A	91-100%	C	60-64%
A-	85-90%	C-	55-59%
B+	80-84%	D+	50-54%
B	75-79%	D	45-49%
B-	70-74%	D-	40-44%
C+	65-69%	F	0-39%

We will cover roughly half the textbook during this semester (and the other half in PHY5210 in the following Winter semester). This is required to prepare you for subsequent courses in the program. **It means that the class pace with be rather fast, so do not fall behind.** Generally, at the beginning of each lecture you will be reminded of about the near-term plan. **That way, you will be able to read the appropriate textbook sections before the lecture in which they will be covered. This will help you a lot.** The class schedule shown below is subject to change but any changes will be discussed in advance in class, and/or via Canvas announcements.

TENTATIVE CLASS SCHEDULE (Subject to change)

Date	Chapter
W 08/28	Syllabus, 1.1
F 08/30	1.2-1.3
M 09/02	Holiday (no class)
W 09/04	1.4
F 09/06	1.5
M 09/09	1.6
W 09/11	1.7
F 09/13	2.1
M 09/16	2.2
W 09/18	2.2
F 09/20	2.3
M 09/23	2.4
W 09/25	2.4-2.5
F 09/27	2.5-2.6
M 09/30	2.6-2.7
W 10/02	**Exam1**
F 10/04	Exam1 review, 3.1
M 10/07	3.2
W 10/09	3.3
F 10/11	3.4
M 10/14	3.5
W 10/16	4.1
F 10/18	4.2
M 10/21	4.2
W 10/23	4.3
F 10/25	4.4
M 10/28	**Exam2**
W 10/30	Exam2 review, 4.5
F 11/01	4.5
M 11/04	4.6
W 11/06	4.7
F 11/08	4.8
M 11/11	4.9-4.10
W 11/13	5.1
F 11/15	5.2
M 11/18	5.3
W 11/20	5.6
F 11/22	5.7-5.9 (if possible)
M 11/25	**Exam3**
W 11/27	Holiday (no class)
F 11/29	Holiday (no class)
M 12/02	Exam3 review, 6.1
W 12/04	6.2
F 12/06	6.3
M 12/09	6.4
W 12/11	**Final Exam**

FINAL EXAM: The final exam will be cumulative and also include the topics that were covered between the third regular exam and the final exam. The final exam date and time is determined by the University. It cannot be changed.

FINAL EXAM: Wed., Dec. 11 2:45−4:45 p.m. MANO 0263

HONORS COURSE: An honors option is available for this course. If you decide to go for this, there will be additional homework problems assigned and these may be more difficult.

The specific requirements to register for honors credit is to fill out a form, signed by the lecturer, and turn in that form and two other documents to the university by the end of September. The two other documents required are the course syllabus (this document), and *"a typed proposal identifying the additional assignment and explaining why this work qualifies for honors credit"*. The lecturer will provide this document, and when available it will be found in Canvas.

You must get a grate of B or better in the regular class and B or better for the honors work to earn honors credit. Note - there is no penalty here. If you sign up for the honors version and decide to stop participating in that later on, this does not appear on your transcript.

TIPS FOR SUCCEEDING IN PHYSICS CLASSES: There is no secret to succeeding at Physics classes. The things you must do to achieve your best results are quite clear and should not be unknown to you. Previous experience with many, many students has shown the following traits and habits are common to the students that excel in physics courses.

1. **Come to class.** At every university I have been associated with studies have been taken to find out what best predicts student success. Regular class attendance is the thing that is most associated with student success. Perhaps this is obvious, but many students do not show up and wonder why they are doing poorly. When you come, put the phone down and pay attention.
2. **Get the book. Read it.** Use it. There is a lot of very good hints and ideas there that will help you truly understand the material.
3. **Read the text beforehand.** You will know what topics are coming up. Read the textbook, and other sources, before that corresponding lecture! Read the material afterward as well.
4. **Put in the time.** You should be spending at least 2 hours outside of the class for every hour of lecture. This is at least 4 hours per week. It is best to spend time both before class getting familiar with the material, and after class reviewing the material.
5. **Practice, practice, practice.** Do the assigned homework, do the extra credit problems, and do other book problems. You can watch Michael Jordan play basketball for 3 hours a day, every day, and you will never get better at basketball - not

unless you yourself put in the time and practice. Reading the textbook is important, but not enough to ensure that you'll be able to solve the problems on the exam. It is only in working problems that you will develop all the necessary skills to solve problems on the exams!

6. **Strive for understanding.** Many students feel if they just "get the answer" from a teacher or google then they have accomplished the task. This is incorrect. You have accomplished your task when you truly understand what the is problem asking, how to set up a path to the solution, and how to finally solve it. Just completing the problem to get some random answer is not enough. Realize that you will have equation sheets during the exams, so memorizing equations or problems will not be terribly helpful.
7. **Do not fall behind.** The course pace will be fast and this is unavoidable. Attend the lectures. Read the textbook before each lecture. Reread #4 above!

TIPS FOR COMMUNICATING WITH COLLEAGUES: We all have different personalities but a common goal - for everyone to understand the physics topics that will be covered in this course. To achieve this goal, we will interact with each other in the lectures and elsewhere (*e.g.* via email or phone). To make these interactions as productive as possible, please follow these basic guidelines:

- **Emails to the lecturer or facilitator(s) should use proper english, and be respectful.** Messages such as "yo prof, ur office hrs, when?" are not likely to get a response - emails to a professor are not the same as texts to your friend (and also, in this case, that information was already made available to you in the Syllabus and you didn't bother to look for it!). You're adults interacting with other adults - act like it.

- **Please include "PHY5200" in the subject line of the email.** The lecturer gets hundreds of emails per day. By including these 7 letters in the subject line, you greatly increase the chances that your message will be seen. Not all emails will get a direct response and may instead be responded to as a general announcement via Canvas, or in-person during the next lecture.

- **Inappropriate language or behavior in lectures, or when conversing with your classmates, will not be tolerated.** It is unnecessary and unproductive. Engaging in this behavior will result in you being asked to leave the classroom, and may incur additional consequences. Additional comments on academic and personal integrity and civility may be found below. It is your responsibility to behave in a civil manner and treat the lecturer and classmates with respect.

STUDENT DISABILITY SERVICES: If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to

meet with you privately during my office hours to discuss your special needs. Student Disability Services mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University. Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

ACADEMIC INTEGRITY: All forms of academic dishonesty are forbidden in this class. Examples of academic dishonesty include all variations of cheating during exams as well as changing test answers for re-grading. Continuing to write after the exam time is up will result in the grade of zero for that exam. All forms of academic dishonesty will be prosecuted to the fullest extent as outlined in the Student Due Process Policy of the University.

Excerpts from the University's Student Due Process Policy regarding disruptive behavior are outlined below. This policy will be enforced during all academic activities relating to this class. **A student who is being disruptive in class will lose 10 points per occurrence from their total score.** This is nearly a full letter grade per occurrence. **A student who is disruptive during exams may receive a zero for this exam.** Repeat offenders will have their course grade continually downgraded and if necessary, they will receive an F for the course. **A student may be brought before the Dean of his or her College for further action.** The WSU Student Due Process Policy is included below.

The most important consequence of cheating/plagiarism or any other form of academic dishonesty, whether or not it is detected, is that you will not be able to do the work, and moreover you will not have the confidence that you can do that part of the course work. The ability to step up in the outside world and say with confidence, "I can do that" is surely one of the primary benefits of a college-level course, and is the source of many of the other benefits. You may "get away" with cheating once or even more than once, but the main penalty, far worse than any grade punishment, is that your college education, which is one of the best things you can do for yourself, will not have the benefits it could have. You're only cheating yourself, **and it's what weaklings do.** Don't forget that you are strong, and you can make yourself stronger!

Wayne State University STUDENT DUE PROCESS POLICY

1.0 PREAMBLE

1. As provided by the Board of Governors in WSUCA 2.31.01, "Student Rights and Responsibilities," and as mandated by academic tradition, the students of Wayne State University possess specific rights and responsibilities. Students are expected to conduct themselves in a manner conducive to an environment, which encourages the free exchange of ideas and information. Students, as integral members of the academic community, have

the right to the assurance that their rights are protected from arbitrary and capricious acts on the part of any other member of the academic community. This Student Due Process Policy is designed to assure that students who are alleged to have engaged in unacceptable conduct receive fair and impartial consideration as specified in this policy.

4.0 PROHIBITED CONDUCT

The following conduct is subject to disciplinary action when it occurs on University premises, or in connection with a University course or University documents, or at a University-sponsored activity:

4.1 All forms of academic dishonesty.

4.3 Physical abuse of another person, or conduct which threatens or endangers another, or verbal or physical threats which cause reasonable apprehension of harm.

4.6 Disorderly behavior that interferes with activities authorized, sponsored, or permitted by the University such s teaching, research, administration, and including disorderly behavior that interferes with the freedom of expression of others.

5.0 DISCIPLINARY SANCTIONS Students found to have committed an act, or acts of misconduct may be subject to one or more of the following sanctions, which shall take effect immediately upon imposition, unless otherwise stated in writing, except as provided in this policy.

5.1 Disciplinary Reprimand. Notification that the student has committed an act of misconduct, and warning that another offense may result in the imposition of a more serious sanction.

5.2 Disciplinary Probation. A disciplinary status which does not interfere with the student's right to enroll in and attend classes, but which includes specified requirements or restrictions (as, for example, restrictions upon the student's representing the University in any extracurricular activity, or running for or holding office in any student group or organization) for a specific period of time as determined in the particular case.

5.3 Suspension. A denial of the privilege of continuing or enrolling as a student anywhere within the University, and denial of any and all rights and privileges conferred by student status, for a specified period of time. At the termination of the suspension the student will be entitled to resume his/her education without meeting any special academic entrance requirements.

5.4 Expulsion.

5.5 Restitution.

5.6 Transcript disciplinary Record.

5.7 Other Sanction.

10.0 PRELIMINARY PROCEDURE

10.1 When a faculty member is persuaded that academic dishonesty has occurred, the faculty member may, without using the mechanism of filing a charge, adjust the grade downward (including downgrading to a failing grade) for the test, paper, or other course-related activity in question, or for the entire course.