I. Course Description

PHY 131: Classical Physics for Physical Sciences & Engineering I (4 credits). The course is the first part of a two-part sequence intended for majors in the physical sciences and engineering who have a strong background in mathematics. It focuses on the mechanics of point particles and simple oscillators, and emphasizes motion in one and two dimensions and the concepts of force, momentum, energy, kinetic theory, and thermodynamics. Calculus is used concurrently with its development in MAT 131. The material will be addressed concurrently with chapters 1-20 in the required text (Giancoli, below). The course consists of 4 hours of lecture/laboratory and 2 hours of recitation per week. Not for credit in addition to PHY 121/123, 131, or 141.

Corequisite: MAT 125 or MAT 131 or MAT 141 or AMS 151

II. Course Learning Objectives

1. Students will demonstrate mastery of physics concepts related to motion in one and two dimensions, Newton’s laws of motion and gravitation, energy, momentum, angular momentum, rigid body motion, wave motion, fluids, heat, kinetic theory, and thermodynamics.

2. Students will be able to think critically and apply appropriate physics concepts in analyzing qualitative problems in classical physics.

3. Students will demonstrate the ability to apply algebraic and calculus-based mathematical reasoning in solving quantitative physics problems.

4. Students will demonstrate proficiency in science process skills by designing and performing experiments to measure physical phenomena and minimize experimental error.

5. Students will demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and dissemination of experimental results.
III. **Required Materials**

2. Along with the text, you MUST purchase a MasteringPhysics subscription with student access code; it is available in the Stony Brook University Bookstore and is valid for 24 months: [http://www.pearsonmylabandmastering.com/northamerica/masteringphysics/students/](http://www.pearsonmylabandmastering.com/northamerica/masteringphysics/students/). The course ID associated with this course is SBPHY131DAWBER. All homework will be assigned and graded electronically.
3. Scientific calculator with trig functions (e.g., TI-83)
4. Turning Point Technologies clicker, which must be registered on Turning Point’s cloud-based system
5. Laboratory notebook

IV. **Homework**

Homework problems will be due Monday evenings at 8:00pm. The problems for the entire semester are posted on the MasteringPhysics website. A MasteringPhysics access code is required to view problems and submit solutions electronically. Students will not be penalized for multiple attempts at problems. Solutions will be discussed in recitation, and will be posted on Blackboard after the due date. Homework will count towards 15% of the final grade for the course.

V. **Recitation**

The recitation is structured to allow informal discussion of physics topics and accompanying homework problems. The recitation instructor, Dr. Weinacht, will administer occasional quizzes that count towards 10% of the final grade. Completing the homework is necessary for success on the quizzes. Attendance is mandatory. Some laboratory experiments and demonstrations will be performed during recitation periods.

VI. **Laboratory: PHY 133**

Laboratory experiments are an essential component of learning physics. The laboratory grade will be based upon participation and successful completion of experiments. For each experiment, students will record 1) the purpose of the experiment, 2) brief procedural outline, 3) materials, 4) data and calculations, 5) graphs (where appropriate), 6) error analysis, and 7) conclusions. The first three sections must be completed before you come to the laboratory; the final four sections will be completed in class. Teaching assistants will check laboratory notebooks at the end of each period for completeness. In addition, students are required to complete three formal laboratory reports during the semester. Each formal lab report will include the 7 sections listed above, typed with 1” margins, 12-point font, and single-spaced. Include the names of your two lab partners. Please be accurate and concise with your written work. You may complete one formal report from labs 2-4 (due Friday, September 26), one from labs 5-7 (due Friday, October 24), and one from labs 8-9 (due Friday, November 21). Each formal laboratory report will be graded on a 20-point scale. The laboratory grade for PHY 133 will be based upon the completion of all experiments and the three formal laboratory reports.

**Lab Make-Ups:** Students must complete all ten labs to receive a passing lab grade. Make-up labs will be scheduled with the TAs or instructors at their convenience.
VII. Exams

There will be two midterm exams - **Friday, October 3 (Chapters 1-8)**, and **Friday, October 31 (Chapters 1-13, cumulative)**. They will be given during the regularly scheduled class in Physics P-118. Students must remain in the classroom for the entire exam period. The final exam (Chapters 1-20, cumulative) is **Thursday, December 11, 2:15-5:00pm**; the location will be announced.

VIII. Grading Structure

Final grades in PHY 131 will be determined as follows:

1. Midterm exams: 15% each
2. Final exam: 35%
3. Homework: 15%
4. Recitation Quizzes: 10%
5. Clicker participation: 10% (including attendance)

IX. Extra Help

Your instructors are available for office hours listed at the beginning of this syllabus. You may also consult the instructors of the parallel section 90, Dr Kelly and Dr Stephens for help in their office hours. You are encouraged to seek help as soon as you are having difficulty, since the cumulative nature of the material makes it difficult to catch up if you fall behind. Teaching Assistants (TAs) will be available for extra help - please check the departmental schedule for the Help Room.

X. Disability Instructions

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, 128 ECC Building (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following web site: [http://www.ehs.sunysb.edu](http://www.ehs.sunysb.edu) and search Fire Safety and Evacuation and Disabilities.

XI. University and Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. One person using the clicker of another to simulate participation in class meetings is academic dishonesty, and will be treated as such. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at [http://www.stonybrook.edu/uaa/academicjudiciary/](http://www.stonybrook.edu/uaa/academicjudiciary/).

XII. Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students’ ability to learn. Faculty are required to follow school-specific procedures: [http://www.stonybrook.edu/commcms/emergency/critical_incident.shtml](http://www.stonybrook.edu/commcms/emergency/critical_incident.shtml).
### Schedule of Topics and Experiments

<table>
<thead>
<tr>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
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| August 25  
Ch 1: Units, Measurement, Error  
Ch 2: One-Dimensional Kinematics | August 27  
Ch 2: Free Fall  
Ch 3: Vectors  
LAB #1: Acceleration – Picket Fence | August 29  
Ch 1-3 Review |
| September 1  
NO CLASS | September 3  
Ch 3: Projectile Motion, Relative Velocity in Two Dimensions  
LAB #2: Projectile Motion  
HOMEWORK #1 DUE | September 5  
Ch 1-3 Review |
| September 8  
Ch 4: Newton’s Laws of Motion  
HOMEWORK #2 DUE | September 10  
Ch 5: Friction, Drag, Terminal Velocity  
LAB #3: Newton’s Laws – Atwood’s Machine | September 12  
Ch 4-5 Review |
| September 15  
Ch 5: Circular Motion  
HOMEWORK #3 DUE | September 17  
Ch 6: Gravitation, Orbits  
LAB #4: Centripetal Force | September 19  
Ch 5-6 Review |
| September 22  
Ch 7: Work & Energy  
HOMEWORK #4 DUE | September 24  
Ch 8: Gravitational Potential Energy, Power  
LAB #5: Conservation of Energy | September 26  
Ch 7-8 Review  
LAB #1 DUE |
| September 29  
Ch 1-8 Review  
HOMEWORK #5 DUE | October 1  
Ch 1-8 Review | October 3  
MIDTERM #1 |
| October 6  
Ch 9: Linear Momentum | October 8  
Ch 9: Two Dimensional Collisions, Center of Mass  
LAB #6: Conservation of Momentum | October 10  
Ch 9-10 Review |
| October 13  
Ch 10: Rotational Kinematics  
HOMEWORK #6 DUE | October 15  
Ch 11: Angular Momentum  
LAB #7: Angular Momentum | October 17  
Ch 10-11 Review |
| October 20  
Ch 12: Static Equilibrium, Elasticity  
HOMEWORK #7 DUE | October 22  
Ch 13: Fluids | October 24  
Ch 12-13 Review  
LAB #2 DUE |
| October 27  
Ch 1-13 Review  
HOMEWORK #8 DUE | October 29  
Ch 1-13 Review | October 31  
MIDTERM #2 |
| November 3  
Ch 14: Simple Harmonic Motion | November 5  
Ch 14: Simple Harmonic Motion  
LAB #8: Simple Harmonic Motion | November 7  
Ch 14 Review |
| November 10  
Ch 15: Waves  
HOMEWORK #9 DUE | November 12  
Ch 16: Sound  
LAB #9: Standing Waves | November 14  
Ch 15-16 Review |
| November 17  
Ch 17, 18: Temperature, Ideal Gases  
HOMEWORK #10 DUE | November 19  
Ch 19: Heat, 1st Law of Thermodynamics  
LAB #10: Thermodynamics Simulations | November 21  
Ch 17-19 Review  
LAB #3 DUE |
| November 24  
Ch 20: 2nd Law of Thermodynamics  
HOMEWORK #11 DUE | November 26  
NO CLASS | November 28  
NO CLASS |
| December 1  
Ch 1-20 Review | December 3  
Ch 1-20 Review  
HOMEWORK #12 DUE | December 5  
Ch 1-20 Review |

**FINAL EXAM:** Thursday, December 11, 2:15-5:00pm