



## PHY 121/123: Physics for Life Sciences I Course Syllabus Fall 2016

**Instructor:** Dr. Angela Kelly [angela.kelly@stonybrook.edu](mailto:angela.kelly@stonybrook.edu)  
**Class Hours:** Mondays & Wednesdays, 8:00-9:20am; Fridays, 8:00-9:50am  
**Classroom:** Physics P-118  
**Office Hours:** Mondays 12:30-2:00pm in Life Sciences Building 092  
Wednesdays 9:30-10:30am in Physics A-141B  
Other times by appointment  
**Graduate TAs:** Aneta Iordanova  
Chris Bryant  
Young Shin Kim  
Xiangdong Li

### I. Course Description

*PHY 121/123: Physics for Life Sciences (3/1 credits).* First part of an introduction to physics with applications to biology, primarily for students majoring in biological sciences or pre-clinical programs. Topics include mechanics, fluid mechanics, and thermodynamics. Strong algebra skills and knowledge of the ideas of calculus are required. Three lecture hours per week. The laboratory component, PHY 123, must be taken concurrently; a common grade for both courses will be assigned. The material will be addressed concurrently with chapters 1-16 in the required text (Knight, below). The course consists of 3 hours of lecture/recitation and 2 hours of laboratory per week. Not for credit in addition to PHY 125, 131, or 141.

*Prerequisites:* 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. Blackboard

Stony Brook's Blackboard website is the location where course files are shared and stored. The course is listed under PHY 121.90 Physics for Life Sciences I - Fall 2016. I will post files for laboratory procedures, lecture notes, clicker questions, etc. Lecture notes (PowerPoint slides in pdf format) will be posted the evening before respective lectures, beginning August 31.



## **IV. Required Materials**

1. Textbook: Knight, R.D., Jones, B., & Field, S. (2015). *College Physics: A Strategic Approach* (3<sup>rd</sup> Edition). Pearson Publishers. ISBN-10: 0321879724, ISBN-13: 9780321879721. The text is available in the campus bookstore for \$180. If you purchase the text, you automatically get the online homework license, which is also required. The eText with access to Mastering Physics costs \$133 in the bookstore and \$111 when purchased online from Pearson and is valid for 24 months: <http://www.pearsonmylabandmastering.com/northamerica/masteringphysics/students/>. The license to access Mastering Physics without the eText costs \$66 and **must be purchased online from Mastering Physics**. We will cover chapters 1-16 in this course.
2. The Mastering Physics course ID associated with this course is PHY121KELLY. 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

## **V. Homework**

Homework problems will be due Tuesday evenings at 11:59pm, unless noted on the course schedule (p. 4). The problems are posted on the Mastering Physics website under course PHY121KELLY. Please register using your student number so your grade may be linked to Blackboard. A Mastering Physics access code is required to view problems and submit solutions electronically. Students will not be penalized for multiple attempts at problems (maximum of 8 attempts). Solutions will be discussed when time allows in lecture and laboratory. Late work is not accepted. Homework will count towards 10% of the final grade for the course. Practice problems are also posted for your optional use – these are arranged by topic.

## **VI. Laboratory: PHY 123**

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 and assign points. 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 **Tuesday, October 11**), one from labs 6-7 (due **Tuesday, November 15**), and one from labs 8 or 10 (due **Friday, December 9**). Each formal laboratory report will be graded on a 20-point scale. The laboratory grade for PHY 123 will be based upon the completion of *all* experiments and the three formal laboratory reports. Late work will be penalized.

**Lab Make-Ups:** Students *must* complete all ten labs to receive a passing lab grade. Make-up labs will be scheduled at the convenience of the TAs or instructors *only with a valid medical excuse*.



## **VII. Exams**

There will be two midterm exams - **Friday, October 7 (Chapters 1-7)**, and **Friday, November 11 (Chapters 8-12)**. They will be given during the regularly scheduled class time in Physics P-118 (8:00-9:45am). The final exam (Chapters 1-16, cumulative) is **Thursday, December 15, 2:15-5:00pm**; the location will be announced.

## **VIII. Grading Structure**

Final grades in PHY 121 will be determined as follows:

1. Midterm exams: 15% each
2. Final exam: 25%
3. Homework: 10%
4. Laboratory reports: 25%
5. Clicker participation: 10% (including attendance)

## **IX. Extra Help**

Dr. Kelly will be available for office hours Mondays (12:30-2:00 pm) in 092 Life Sciences, and Wednesdays (9:30-10:30 am) in Physics A-141B. I am also available by appointment (please e-mail). I will add additional hours in the week before midterm and final exams. I encourage you 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, both graduate and undergraduate) will also be available - please check the departmental schedule for the Help Room in Physics A-131.

## **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> 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. 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/>. One person using the clicker of another to simulate participation in class meetings is academic dishonesty, and will be treated as such.

## **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).



# DEPARTMENT OF PHYSICS AND ASTRONOMY

## XIII. *Schedule of Topics and Experiments*

Monday	Wednesday	Friday
August 29 Ch 1: Representing Motion	August 31 Ch 2: Motion in One Dimension	September 2 Ch 1-2 Review <b>LAB #1: Acceleration – Picket Fence</b>
September 5 NO CLASS	September 7 Ch 3: Vectors <b>HOMEWORK #1 DUE</b>	September 9 Ch 3 Review <b>LAB #2: Projectile Motion</b>
September 12 Ch 3: Motion in Two Dimensions	September 14 Ch 4: Newton's Laws of Motion <b>HOMEWORK #2 DUE</b>	September 16 Ch 4 Review <b>LAB #3: Newton's Laws – Atwood's Machine</b>
September 19 Ch 5: Applying Newton's Laws <b>HOMEWORK #3 DUE (Tues 9/20)</b>	September 21 Ch 6: Circular Motion, Orbits, Gravity	September 23 Ch 5-6 Review <b>LAB #4: Centripetal Force</b>
September 26 Ch 7: Rotational Motion <b>HOMEWORK #4 DUE (Tues 9/27)</b>	September 28 Ch 7: Torque	September 30 Ch 7 Review <b>LAB #5: Rotation/Torque Simulations</b>
October 3 Ch 1-7 Review <b>HOMEWORK #5 DUE (Tues 10/4)</b>	October 5 Ch 1-7 Review	October 7 <b>MIDTERM #1</b>
October 10 Ch 8: Equilibrium & Elasticity <b>LAB #1 DUE (Tues 10/11)</b>	October 12 Ch 9: Momentum	October 14 Ch 8-9 Review <b>LAB #6: Conservation of Momentum</b>
October 17 Ch 9: Angular Momentum <b>HOMEWORK #6 DUE (Tues 10/18)</b>	October 19 Ch 10: Energy & Work	October 21 Ch 9-10 Review <b>LAB #7: Angular Momentum</b>
October 24 Ch 10: Energy & Work <b>HOMEWORK #7 DUE (Tues 10/25)</b>	October 26 Ch 11: Using Energy	October 28 Ch 10-11 Review <b>LAB #8: Conservation of Energy</b>
October 31 Ch 12: Thermal Properties of Matter <b>HOMEWORK #8 DUE (Tues 11/1)</b>	November 2 Ch 12: Thermal Properties of Matter	November 4 Ch 12 Review <b>LAB #9: Thermodynamics Simulations</b>
November 7 Ch 8-12 Review <b>HOMEWORK #9 DUE (Tues 11/8)</b>	November 9 Ch 8-12 Review	November 11 <b>MIDTERM #2</b>
November 14 Ch 13: Fluids <b>LAB #2 DUE (Tues 11/15)</b>	November 16 Ch 13: Fluids Ch 14: Oscillations	November 18 Ch 13-14 Review <b>LAB #10: Sound</b>
November 21 Ch 14: Oscillations Ch 15: Sound <b>HOMEWORK #10 DUE (Tues 11/22)</b>	November 23 NO CLASS	November 25 NO CLASS
November 28 Ch 15: Sound <b>HOMEWORK #11 DUE (Tues 11/29)</b>	November 30 Ch 16: Superposition	December 2 Ch 14-15 Review
December 5 Ch 16: Standing Waves	December 7 Ch 1-16 Review <b>HOMEWORK #12 DUE</b>	December 9 Ch 1-16 Review <b>LAB #3 DUE</b>
<b>FINAL EXAM: Thursday, December 15, 2:15-5:00pm</b>		