

Instructors: Prof. Nick Gerontakis / SSC 112 / nsgeront@bsc.edu

Class Info:

- Monday 2:00–4:50 pm / SSC 111

Office Hours: I invite you to stop by in-person or virtually and utilize me as resource for any questions, concerns, or clarifications you may want.

- Please See Schedules by Office Door

This laboratory class is not a 'cookbook' lab where everything has been laid out and you only have to do the activity and record the data. You will instead be challenged to set up the equipment yourselves, choose an appropriate hypothesis or prediction to test yourselves, and decide the number of trials yourselves. **You are required to stay for the entirety of the class. If you finish collecting and analyzing data early, then you should begin writing the lab report.**

You will spend the first hour of each lab period working on one or more faculty-guided "tutorial" problems. The tutorial questions are posted on the lab Moodle page. ***Every Tutorial demonstration and assignment is an old test question.***

Academic Accessibility and Accommodations: Students with a disability that qualify under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act and require accommodations should be registered with BSC's Accessibility Office. If you are registered for academic accommodations, please make an appointment with me as soon as possible to discuss any accommodations that may be necessary. During this discussion you are not expected to disclose any details concerning your disability though you may do so at your discretion. If you have a disability but have not yet registered, please contact Dr. Sandra Foster, Assistant Director of Accessibility Services and Resources, at 205-226-7909 or smfoster@bsc.edu, or visit Olin 210. Keep in mind that no accommodation will be made unless and until the instructor receives official notification from the College.

FREE Textbook: OpenStax University Physics, [Vol. 1](#), This text is available in many formats online. If you are the kind of person who likes to hold a book in your hands, you can follow a link to purchase the book (hard or paper cover) online. The OpenStax website also includes a [Student Resources](#) section which includes a Student Solution Guide to homework questions and exercises in the book. This provides valuable help in the form of homework practice.

Reading: Before each lab you must complete the pre-lab which includes Tutorial questions and the Lab assignment on Moodle as well as the appropriate material of the textbook. You need to

read the material actively, which means taking notes, and writing questions that arise in your study. ***Actively reading the textbook, i.e. writing your own notes or discovering questions, has been shown to greatly improve the conceptual knowledge necessary to do well in this class.***

In-Lab Activities: You will work with lab partners, usually in groups of three, to carry out the experimental procedures. Each group of lab partners will have a separate lab station, which will be set up with the instruments and equipment you need. A laboratory instructor will be present to answer questions and to help if you have difficulties.

Tutorial Assignments: You will spend the first hour of each lab period working on one or more faculty-guided "tutorial" problems. This is where you will get a good foundation on how to solve homework problems. These tutorial problems are graded not just for correctness, but also for completeness and adherence to the problem-solving ***process*** that you will learn. The correct answer will usually come when you employ good problem-solving strategies. Please see your instructor or teaching assistant for help. Your grade on tutorial homework will factor into your lab grade, not your homework grade.

Tutorial is intended to hone your practical problem solving skills. Through pre-class reading and classroom discussion, you will have already been introduced to the applicable material that we will employ here. Therefore, you should be familiar with the basic terms and concepts, though you are not expected to have yet reached a level of mastery. Feedback is essential, so please ask questions whenever they arise.

During the tutorial, the instructor will first work through a demonstration problem as the students observe. You should be attentive, follow carefully, and take thorough notes. In particular, you should pay attention to how the instructor monitors the work and continually assesses it. At the end, you will be given access to a transcript of the solution, but this does not lessen the importance of taking good notes yourself! Remember that the path taken to solving a problem is what's truly essential. The answer is only one detail.

I encourage you to work together on the tutorial assignments. Even if you think you understand the material well, you will learn even more by helping someone who is struggling on a particularly challenging problem. (*Remember, the best way to learn something is to teach it!*) However, each tutorial answer submitted must be your own work. Allowing anyone else to submit any answers in your name is an Honor Code violation.

Tutorials Covered:

Tutorial 1 – Kinematics in 1D

Tutorial 2 – Projectile Motion

Tutorial 3 – Newton's Laws

Tutorial 4 – Free Body Diagrams

Tutorial 5 – Collisions in 1-Dimension

Tutorial 6 – Falling and Rebounding

Tutorial 7 – Rotational Kinematics

Tutorial 8 – Rotational Dynamics

Tutorial 9 – Static Equilibrium

Tutorial 10 – Simple Harmonic Motion

Tutorial 11 – Standing Waves

Labs: The laboratory is an important component of the course and you must be enrolled in a laboratory section to take this class. No matter your grade on the rest of the assignments, you cannot pass the course if you do not pass the lab. Attendance in the lab is mandatory. Your laboratory instructor will go over the rules and policies for the lab.

Labs Covered:

Lab 1 – Kinematics in 1D

Lab 2 - 3 – Projectile Motion

Lab 4 – Collisions in 1-Dimension

Lab 5 – Falling and Rebounding

Lab 6 – Rigid Body Rotation

Lab 7 – Static Equilibrium

Lab 8 – Harmonic Oscillation – Springs

Lab 9 – Standing Waves

Lab Reports: Your lab reports are required to be complete, legible, and organized in such a way that your experimental results, analysis and conclusions can be clearly understood. You also be given an opportunity to rewrite the first lab report for two reasons: 1) This is usually the lowest lab report grade students get as they adjust to the class and semester and 2) It should motivate you all to read the comments and suggestions on the lab reports, so as to not repeat common mistakes.

Although each lab session will have its own instructions and procedures, there are some common methods and principles that must be applied for all lab work; such as units, significant figures, arithmetic operations, scientific notation, and accuracy & comparison. To see the methods and principles in detail, please go to Moodle and read through all the Introduction material.

Grading: Your lab grade is 15% of your class grade and will be determined by a weighted average of all assignments as follows

Tutorial Assignments	5%
Lab Reports	5%
Lab participation	5%

Your participation grade will be based on the fraction of labs you actively engaged in (*attended, on-time, and participated*).

Learning Outcomes: This course is designated in the BSC Explorations curriculum as a Creative Problem Solving Course in Scientific Methodologies (SM). By the end of the course you will be able to identify problems in physics with appropriate rationale for their investigation, develop testable hypotheses about these problems, design tests of your hypotheses, analyze and draw conclusions from the results of such tests, and communicate your findings.

In addition, by the end of this course you will have demonstrated mastery of basic problems of classical mechanics by identifying the relevant physical principles for addressing a problem, developing effective strategies for solving the problem, formulating the problem as one or more equations and manipulating them into a form that can be evaluated with input data, applying and working with appropriate units for the physical quantities, and determining the reasonableness of your solutions by inspecting the physical context and using order-of-magnitude estimates of relevant quantities.

Honor Code: You are encouraged to cooperate and discuss tutorial problems and lab write-ups with your classmates. However, you may not turn in tutorials or lab write-ups that are not your own work. Once again, you may not use, or even look at solutions compiled by others. Be aware that I will bring any Honor Code violation I discover before the Honor Council. If you are found to be in violation for any part of an assignment, you will at minimum receive no credit for that assignment, in addition to any other action that may come from the Honor Council.

BSC Resources for Writers and Readers Located in Humanities 102, the BSC Writing Center offers in-person and virtual peer-to-peer tutoring and quiet, supportive lab space to work on writing assignments. The Center's tutors are students from a wide variety of majors on campus and have the range to address student writing needs with discipline specificity. Supervised and assisted by BSC Writing Center directors, the tutors provide one-on-one consultations for any student at any point in the writing process. The BSC Writing Center is open Sunday-Thursday 4pm-8pm. To ensure a full 30-minute tutorial time slot, students are encouraged to be mindful of assignment-heavy weeks, keep track of due dates, and visit the Writing Center at their earliest availability during open hours. Please contact Dr. MK Foster or Professor Laura Tolbert (writingcenter@bsc.edu) with any questions or requests for virtual appointments.