

# **COURSE SYLLABUS**

## **PHYS 1411 – Introduction to Physics I**

**Credit Hours: 4**

**Spring 2018**

**Farrington Building, Room 209**

**11:00 – 11:50 MWF**

**Laboratory: F209 2:00 - 4:50 Mon or F209 2:30 - 5:20 Thurs.**

**Instructor:** Dr. Joel W. Walker

**Phone:** (936) 294-4803

**Main Physics Office:** (936) 294-1601

**Email:** jwalker@shsu.edu

**Office:** Farrington, room 204D

1:15-2:00 MWF or by appointment

**Course Description:** A thorough introduction to the more general topics in mechanics. Considerable attention is given to the solution of problems with the emphasis placed on fundamental concepts. A laboratory/problem session is an integral part of the course. Writing Enhanced. Prerequisites MTH 1420. If high school physics or calculus has been taken, then MTH 1420 may be taken concurrently. Exemption is provided for prequalified graduates of the “Physics Bootcamp”.

**Course Goals:** This course is designed to develop basic competencies in the techniques of classical mechanics. Along the way, we will gain insight into methods of thought and experiment which have proved profitable to describing the rules at work in our universe. A strong sense of conceptual intuition is a vital tool to any physicist, and we will attempt to train and develop this skill. However, mathematics is the natural language for concisely and accurately communicating physical law in a manner which is suited to make predictions. A key course objective will be helping each student to recognize the real-world connection of mathematics and physical processes. Beyond just the application of stock formulae to problems, each student must master the techniques of deriving equations applicable to special cases from more fundamental principles. Success in this course will not be achieved by rote memorization, or absorption of facts. Rather, the student must learn to skillfully apply the provided tools for themselves, becoming adept at logical reasoning and creative problem solving.

<b>Required Textbook:</b>	Fundamentals of Physics, 10th Edition by Halliday, Resnick & Walker (Vol I or Combined)
<b>Required Supplies:</b>	A calculator with trigonometric functions is essential. Graphing calculators are allowed, but not required. In all testing situations, your calculator may be utilized for standard arithmetic and trigonometric computation only. The use of memory for storage of notes is strictly and expressly prohibited.
<b>Assignments:</b>	Homework assignments will be given for each chapter. Regular, personal application of concepts is essential to mastery of the required material. Furthermore, these problems will be a valuable insight into what material is considered important by your instructor. Careful completion of all assignments is in itself an effective way to boost your course average. Moreover, failure to participate will almost certainly damage exam performance. The homework will be online, using WileyPLUS – you must register here: <a href="https://edugen.wileyplus.com/edugen/class/cls629121/">https://edugen.wileyplus.com/edugen/class/cls629121/</a>
<b>Exams:</b>	3 major examinations will be given during the semester, in addition to a comprehensive final. If a special situation exists which would cause you to miss an exam, this <b>MUST</b> be made known to me prior to the date of the test if possible. Otherwise, a makeup will be allowed in only the <b>MOST EXCEPTIONAL</b> situations, evaluated on a case-to-case basis.
<b>Grading Plan:</b>	The Laboratory and recitation are worth 20%. The homework and 3 semester exams are each worth 15%. It is intended that your confidence and ability will grow tremendously during the course of the semester. The comprehensive final is your chance to show how far you have come, and makes up 20% of the full semester average, for a total of 100%.
<b>Class Rules:</b>	<p>All class members are expected to respect the proceedings of this course, and the learning environment of their fellow students. This principle has several practical implications, some of which are enumerated below.</p> <ol style="list-style-type: none"> <li>1) Do not cheat. Violators are subject to dismissal on a 1<sup>st</sup> offence.</li> <li>2) Regular punctual attendance is expected of all class members.</li> <li>3) There is to be absolutely no use of Cellular phones in the classroom, for either voice or text communication. Parents of young children and professionals who may reasonably expect some chance of an emergency contact should silence their phones, and discreetly excuse themselves if it becomes necessary to take a call. All others should turn off or ignore their phones entirely.</li> </ol>
<b>Email Guidelines:</b>	<p>Email communication with your instructor should be made in a professional manner. Instant-Message style notes are not acceptable in a business or academic setting. All email should:</p> <ol style="list-style-type: none"> <li>1) Include your name and course information.</li> <li>2) Include a proper salutation, body, and closing.</li> <li>3) Make a reasonable attempt at correct grammar, capitalization, punctuation, and spelling.</li> </ol>

### Week-by-Week Schedule

PHYS 1411 is the standard first semester calculus-based course in physics offered by universities around the world to beginning physics and engineering majors, as well as the students of several other hard science disciplines. The list of topics taught in this course is very well standardized. The following schedule, which provides a *rough* sequential summary of the expected coverage, is *subject to revision* at discretion of the instructor.

Week 1	Linear Motion with Constant Acceleration
Week 2	Vectors and Vector Products
Week 3	Two-Dimensional and Circular Motion
Week 4	Newton's Laws of Motion
Week 5	Applications of Forces
Week 6	Work-Energy Theorem
Week 7	Conservation of Energy
Week 8	Conservation of Momentum
Week 9	Rotation, Torque, and Angular Momentum
Week 10	Gravitation and Orbits
Week 11	Simple Harmonic Motion
Week 12	Applications of Waves
Week 13	Applications of Fluids
Week 14	The Laws of Thermodynamics
Week 15	Applications of Gases

**Tips for Success:**

This is likely to be one of the more demanding courses you encounter during your college career. It can also be rewarding and enjoyable. Several suggestions for a good start are printed here.

- 1) Make sure that you are proficient in the mathematical prerequisites. Mathematics is the essential language used to concisely and precisely state the content of physical law. You must be able to speak the language in order to proceed in the course. We will make extensive use of algebra, trigonometry and calculus. We will assume a functioning knowledge of these subjects, but will review advanced topics as needed with detailed example solutions.
- 2) Attend class regularly and take effective notes. It is certainly the case that I will focus class time on the concepts and materials which I deem most valuable, beneficial and instructive. It stands to reason that the same material will form the core of what will subsequently be tested.
- 3) Focus on Ideas and Concepts, not Memory. This course is fundamentally different in design than most you have probably taken prior. Retention of facts alone will not suffice. Success will come instead from the skillful application of the tools and logical thought processes developed. We will employ only short list of equations. Your job will be to correctly understand how, when, and why each equation applies in context.
- 4) Complete all required homework, and attempt problems individually. Regular, personal application of the concepts encountered is the only way to go beyond understanding someone else's solution, and develop confidence in your own problem solving skills. There is simply no substitute here for the experience gained by long practice. Assignments will be given for each course chapter. These will be collected and assigned a grade. Failure to participate will also certainly damage your test and quiz performance. Additionally, these problems can give valuable insight into the material favored by your instructor.
- 5) Seek out help. It is certainly important to persevere through, and even focus your attention especially toward the problems which you have greatest difficulty in solving. However, repeated application of misunderstood tools and indefinite lockdown on a single issue are also damaging and discouraging. Study partners who are also enrolled in physics 1411 can be very beneficial for comparing and correctly completing homework. It is good strategy for each member to first attempt all problems alone prior to such meetings, or to intersperse private and group work during the meeting. Office hours are also available for your benefit, and groups are especially welcome. Additionally, the SPS offers free tutoring a few nights a week, later into the semester.
- 6) Don't give up. Don't fall into a destructive cycle where frustration blocks participation in the class and related activities. At exams, focus first on the things you know - then fight for each remaining point, never dismissing entire problems at a glance. It may take some time to learn the required way of thinking. However, it can sometimes finally "click" like a light switch, and a struggling student can rapidly shift from doing almost nothing correctly, to almost everything.
- 7) Worry less about your grade, and more about developing understanding. If you are dedicated to absorbing and taking ownership of the material, your grade will take care of itself.

## **Standard University Policies**

The following are university-wide official policies which apply to this course. Additional details are available at the web address: <http://www.shsu.edu/syllabus/>

**Academic Dishonesty:** Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom.

**Classroom Rules of Conduct:** Students are expected to assist in maintaining a classroom environment that is conducive to learning. Students are to treat faculty and students with respect. Students are to turn off all cell phones while in the classroom. Under no circumstances are cell phones or any electronic devices to be used or seen during times of examination. Students may tape record lectures provided they do not disturb other students in the process.

**Student Absences on Religious Holy Days:** Students are allowed to miss class and other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Students remain responsible for all work.

**Students with Disabilities Policy:** It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should visit with the Office of Services for Students with Disabilities located in the Counseling Center.

**Visitors in the Classroom:** Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

**USE OF TELEPHONES AND TEXT MESSAGERS IN ACADEMIC CLASSROOMS AND FACILITIES:** The use by students of electronic devices that perform the function of a telephone or text messenger during class-time may be prohibited if deemed disruptive by the instructor to the conduct of the class. Arrangements for handling potential emergency situations may be granted at the discretion of the instructor. Failure to comply with the instructor's policy could result in expulsion from the classroom or with multiple offenses, failure of the course. Any use of a telephone or text messenger or any device that performs these functions during a test period is prohibited. These devices should not be present during a test or should be stored securely in such a way that they cannot be seen or used by the student. Even the visible presence of such a device during the test period will result in a zero for that test. Use of these devices during a test is considered de facto evidence of cheating and could result in a charge of academic dishonesty. <http://www.shsu.edu/students/guide/StudentGuidelines2010-2012.pdf#page=29>