

## **PHYS 0174: Physics for Science and Engineering 1**

*(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course website and announced in class)*

**Instructor:** Richard C. Stehle, Ph.D.  
 Mechanical Engineering Faculty  
 Office: Rm 4-219  
 Phone: 028-64566592  
 Email: richardstehle@scu.edu.cn

**Office Hours:** Tuesdays 10:30am-11:30am  
 Wednesdays 10:30am-11:30am  
 Thursdays 10:30am-11:30am and 2:00pm-3:00pm

### **Lecture Times:**

Section	Monday	Tuesday	Wednesday
1	10:15am-11:00am, Rm 4-212	xx	4:45pm-5:30pm, Rm 3-103
	11:10am-11:55am, Rm 4-212	xx	5:40pm-6:25pm, Rm 3-103
2	8:15am-9:00am, Rm 4-212	1:50pm-2:35pm, Rm 3-103	xx
	9:10am-9:55am, Rm 4-212	2:45pm-3:30pm, Rm 3-103	xx
3	1:50pm-2:35pm, Rm 3-103	4:45pm-5:50pm, Rm 3-103	xx
	2:45pm-3:30pm, Rm 3-103	5:40pm-6:25pm, Rm 3-103	xx

### **Teaching Assistants:**

Pengfei Chen [Daniel.cpf@qq.com](mailto:Daniel.cpf@qq.com)  
 Weifeng Zhang [1403054600@qq.com](mailto:1403054600@qq.com)

**Catalog Description:** 4 Credits; As the first part of a two-semester introduction to general physics, this course introduces students to the basic principles of classical Newtonian mechanics and gravitation. Topics covered include motion in 1-, 2-, and 3-dimensions, Newton's Laws, work and energy, rotational motion, momentum, gravitation, fluid mechanics, harmonic motion and thermodynamics.

### **Required Text:**

Principles of Physics, 10<sup>th</sup> Edition, Halliday, Resnick, Walker. International Student Version

**Course Objective:** The goal of this course is to give you an introductory overview of the subject of physics, starting from the description of the fundamental quantities such as time, distance, and mass, and to progress through the description of nature using Newtonian mechanics and its

application to gravity. Strong mathematical skills are needed to test your understanding of the models and theories that you will be introduced to.

As the semester progresses you will learn to apply knowledge of mathematics, science, and engineering that requires to:

- Be familiar with the basic concepts and methods physicists use to analyze the world.
- Interpret the different units and scales of measurable quantities.
- Convert units of mechanical quantities
- Make use vectors to describe and analyze motion
- Describe and analyze motion with constant acceleration
- Apply differential calculus to the analysis of motion
- Analyze simple situations and explain them to other people.
- Make use of motion diagrams
- Acquire a thorough understanding of the concept of force
- Apply newton's laws to simple physical systems
- Apply the principle of conservation of energy to mechanical systems
- Interrelate the concepts of physical work, forces, potential, and kinetic energy
- Apply the principle of conservation of linear momentum
- Apply concepts such as torque and angular momentum to rotation of rigid bodies
- Apply newton's law of gravitation to planetary motion
- Assimilate new material and apply it to analyze different situations

### **Course Outline:**

#### **Part 1:**

Measurement (Ch. 1)

Motion along a Straight Line (Ch. 2)

Vectors (Ch. 3)

Motion in Two and Three Dimensions (Ch. 4)

Force and Motion (Ch. 5-6)

#### **Part 2:**

Energy and Work (Ch. 7-8)

Linear Momentum (Ch. 9)

Rotation (Ch. 10)

Angular Momentum (Ch. 11)

Equilibrium and Elasticity (Ch. 12)

#### **Part 3:**

Gravitation (Ch. 13)

Fluids (Ch. 14)

Oscillations (Ch. 15)

Waves (Ch. 16-17)

Thermodynamics (Ch. 18-20)

**Examination Schedule:**Exam I on Monday March 27<sup>th</sup>Exam II on Monday May 15<sup>th</sup>Exam III on Monday June 26<sup>th</sup>

Exams will be during normal lecture time (90 mins).

**Course Grading:**

Homework	25%
Exam I	25%
Exam II	25%
Exam III	25%

Homework is to be submitted in class at the beginning of lecture on the assigned due date. Show all work and clearly mark answers. Late Homework will receive no credit.

**Grading Scale:** A 10-point scale will be used as a baseline for final grades (A, A- > 90, 89 > B+, B, B- > 80, etc.). An additional curve may be applied, as determined by the overall final grade distribution of the class. Grades of A-, B+, B-, etc. will be determined at the instructor's discretion.

**Course Schedule:**

Week 1	27-Feb	28-Feb	1-Mar
	Course Introduction- Measurements	Motion along a Straight Line	Motion along a Straight Line
Week 2	6-Mar	7-Mar	8-Mar
	Vectors	Motion in 2- and 3- Dimensions	Motion in 2- and 3- Dimensions
Week 3	13-Mar	14-Mar	15-Mar
	Motion in 2- and 3- Dimensions	Force and Motion	Force and Motion
Week 4	20-Mar	21-Mar	22-Mar
	Force and Motion	Test 1 Review	Test 1 Review
Week 5	27-Mar	28-Mar	29-Mar
	<b>TEST 1</b>	Kinetic Energy and Work	Kinetic Energy and Work

Week 6	3-Apr	4-Apr	5-Apr
	<b>No Class-Holiday</b>	<b>No Class-Holiday</b>	Potential and Conservation of Energy
Week 7	10-Apr	11-Apr	12-Apr
	Potential and Conservation of Energy	Potential and Conservation of Energy	Linear Momentum
Week 8	17-Apr	18-Apr	19-Apr
	Linear Momentum	Linear Momentum	<b>No Class</b>
Week 9	24-Apr	25-Apr	26-Apr
	Rotation	Rotation	Rotation
Week 10	1-May	2-May	3-May
	<b>No Class-Holiday</b>	Angular Momentum	Angular Momentum
Week 11	8-May	9-May	10-May
	Equilibrium and Elasticity	Test 2 Review	Test 2 Review
Week 12	15-May	16-May	17-May
	<b>TEST 2</b>	Gravitation	Gravitation
Week 13	22-May	23-May	24-May
	Gravitation/Fluids	Fluids	Fluids
Week 14	29-May	30-May	31-May
	<b>No Class-Holiday</b>	<b>No Class-Holiday</b>	<b>No Class-Holiday</b>
Week 15	5-Jun	6-Jun	7-Jun
	Oscillations	Waves	Waves
Week 16	12-Jun	13-Jun	14-Jun
	Waves	1 <sup>st</sup> Law Thermodynamics	1 <sup>st</sup> Law Thermodynamics
Week 17	19-Jun	20-Jun	21-Jun
	Kinetic Theory of Gases	2 <sup>nd</sup> Law Thermo/ Test 3 Review	2 <sup>nd</sup> Law Thermo/ Test 3 Review
Week 18	26-Jun		
	<b>TEST 3</b>		

**Class Policies:**

Regular class attendance is expected and encouraged. Each student is responsible for all of the material presented in class and in the reading assignments. Exams will emphasize treatment of material covered in lectures.

In general, no late assignments will be accepted or makeup exams given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend an exam or meet a due date, you must contact the instructor prior to the exam or due date. Arrangements will be made for students on a case by case basis. (Failure to contact the instructor prior to the exam or assignment due date will result in a zero on that exam/assignment.)

**Academic Integrity Policy:**

“Violations of academic integrity include, but are not limited to, *cheating, plagiarism, or misrepresentation in oral or written form*. Such violations will be dealt with severely, in accordance with University policy. Plagiarism means representing someone else’s idea or writing as if it were your own. If you use someone else’s ideas or writing, be sure the source is clearly designated.” It is expected that students adhere to the academic integrity policy that is presented in the Student’s Honor Code of Conduct / Student Handbook.

**Disability Services:**

Any personal learning accommodation that may be needed by the student to be successful in this course must be told to the instructor immediately in order to assure compliance and accommodation. Audio or video recording (or any other form of recording) of classes is not permitted unless expressly allowed by the instructor as a special accommodation for students who are currently registered with the Disability Resource Services Program and are approved for this accommodation. Recordings allowed as special accommodations are for the personal use of the DRS-approved student, and may only be distributed to other persons who have been approved by the DRS program. The instructor may require the student to sign an Audio/Video Recording Agreement, which they may keep for their records.