



Shanghai University of Finance & Economics

2019 Summer Program

PHY 101 Introduction to Physics with Lab

Course Outline

Term: June 3 – June 28, 2019

Class Hours: 12:00-13:50 (Monday through Friday)

Course Code: PHY 101

Instructor: Dr. Jiang Yu

Home Institution: Fitchburg State University, Massachusetts, USA

Office Hours: TBA and by appointment

Email: jyu@fitchburgstate.edu

Credit: 4

Class Hours: This course will have 52 class hours, including 32 lecture hours& lab sessions, 8-hour TA discussion sessions, 4-hour review sessions, professor 8 office hours.

Course Description:

Physics 101 is an introductory college physics course. The mathematical language required is algebra/trigonometry. The physics principles explored are of Newtonian Mechanics, including the core physical concepts, laws, principles, and processes that provide a broad way of thinking about the mechanical physical world.

Course Objectives:

To learn and develop a good understanding of the core concepts, laws, and principles of the classical mechanics, including 1-D and 2-D kinematics, forces and Newton's Laws, gravitation, rotational motion, conservation laws of energy and momentum, and oscillations and mechanical waves.

Required Textbooks:

- College Physics, 4th Ed., by Knight, Jones, & Field.
- MasteringPhysics, online access purchased via Pearson Publishing website



上海财经大学

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Also required:

- A laptop, tablet, or smart phone to access MasteringPhysics. This is required for every class.
- A scientific calculator is desirable. Phone will not be allowed to use during exam time.

Grading & Evaluation:

- Homework Assignments: 20% (10% pre-lecture homework and 10% post-lecture homework, daily)
- In-Class Quizzes: 20% (every class)
- Labs: 20% (2 labs each week, including performance and report)
- Midterm Exam: 20% (kinematics, dynamics, and gravitational law)
- End-term Exam: 20% (conservation laws and rotational motion)

Grades

Course grade will be based on the percentage of composite score of the graded work:

Final Score (%)	90	87	83	80	77	73	70	67	63	60	<60
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F



Course Schedule (Tentative)

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	Linear Kinematics: <ul style="list-style-type: none"> • Position • Displacement • Velocity • Acceleration Motion diagrams	Motion graphs & equations: <ul style="list-style-type: none"> • $x(t)$ • $v(t)$ • $a(t)$ Motion of $a = \text{constant}$	Lab: Free Fall & measurement of gravitational g	Rotational kinematics: <ul style="list-style-type: none"> • Position • Displacement • Velocity • Acceleration Uniform circular motion	TA session
Week 2	Forces: <ul style="list-style-type: none"> • Tensional • Normal • Frictional • Weight Newton's laws	Applications of Newton's laws: <ul style="list-style-type: none"> • Equilibrium • Dynamic problems 	Universal gravitational law Lab: uniform circular motion & measurement of gravitational g	Fluids: <ul style="list-style-type: none"> • Density, Pressure • Archimedes' Principle Lab: Measurement of density of a liquid	TA session
Week 3	Momentum: <ul style="list-style-type: none"> • Impulse • Momentum • Conservation of linear momentum Collisions	Mechanical Energy: <ul style="list-style-type: none"> • Work • Kinetic energy • Potential energy • Conservation of mechanical energy 	Lab: Atwood's Machine & conservation laws	Rotational dynamics: <ul style="list-style-type: none"> • Angular momentum • Rotational energy Lab/demo: Conservation law in Rotation	TA session
Week 4	Oscillations: <ul style="list-style-type: none"> • SHM • Simple Pendulum • Mass-spring system 	Mechanical waves: <ul style="list-style-type: none"> • Longitudinal • Transverse Lab: Description of waves	Sound: <ul style="list-style-type: none"> • Frequency • Speed • Decibel • Doppler Effect 	Lab: Measurement of the speed of sound	TA session