



**Hankuk University of Foreign Studies**  
**2025 Winter Session**  
**PHY 101 Introduction to Physics with Lab**  
**Course Outline**

**Course Code: PHY 101**

**Instructor: Roberto Vega**

**Home Institution: Southern Methodist University**

**Office Hours: TBA**

**Email: rvega@mail.smu.edu**

**Lab TA's: TBA**

**Credit: 4**

**Class Hours:**

This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 24 laboratory hours.

**Course Description:**

This course will provide an introduction to Classical Mechanics, the precise description of motion and the causes of change of motion.

**Course Objectives:**

1. Students will be able to develop quantitative models appropriate to problems in Physics. In particular students will learn Newton's Laws and how they govern motions of bodies in space.
2. Students will be able to assess the strengths and limitations of quantitative models and methods used in Physics.
3. Students will be able to apply symbolic systems of representation.
4. Students will be able to collect, organize and analyze data from a variety of sources. Students will be able to formulate structured and logical arguments.



5. Students will be able to test hypotheses and make recommendations or predictions based on results.
6. Students will be able to communicate and represent quantitative information or results numerically, symbolically, aurally, visually, verbally, or in writing.
7. Students will have a basic understanding of the laws of mechanics and Newton’s law of gravitation.
8. Students will learn Bernoulli’s Laws and aspect of Fluid motion.

**Required Textbooks:**

Fundamentals of Physics by David Halliday, Robert Resnick and Jearl Walker, 12th ed.

**Grading & Evaluation:**

Course will be evaluated based on homework 25%, two midterm exams 50%, and one final exam 25%.

**Grading System (1 ~ 100)**

A+ : 96 - 100	A : 91 - 95
B+ : 86 - 90	B : 81 - 85
C+ : 76 - 80	C : 71 - 75
D+ : 66 - 70	D : 60 - 65
F : 0 - 59	
Pa : Pass	Fa : Fail

**Course Schedule:**

<b>PHY 101 Course Syllabus</b>				
<b>Textbook: Halliday, Fundamentals of Physics, 12e</b>				
<b>Lecture</b>	<b>Week</b>	<b>Lecture Topic</b>	<b>Text Reading</b>	<b>Helpful Links</b>



1	Week 1	Introduction	1.1-1.3	
2		Motion in One Dimension, Velocity	2.1.-2.2	<a href="#">1-D Kinematics</a>
3		Motion in One Dim., Acceleration	2.3-2.4	<a href="#">Free Fall</a>
4		Motion in One Dimension - Free Fall	2.5	
5		Vectors	3.1-3.3	<a href="#">Vector Algebra</a>
6		Motion in Two-Dimensions	4.1-4.3	
7		Projectile Motion	4.4	<a href="#">Projectile Motion</a>
8		Circular Motion	4.5	<a href="#">Circular Motion</a>
9		Forces and Newton's Laws	5.1-5.2	
10		Newton's Laws Applications	5.3	
11	Week 2	Newton's Laws Applications	5.3	<b>Homework set 1 due</b>
12		Resistance and Newton's Laws	6.1-6.2	
13		Drag Force	6.2	
14		Circular Motion and Force	6.3	
15		Work and Kinetic Energy	7.1-7.2	<a href="#">Scalar Product of Vectors</a>
16		Work and Gravity	7.3	<a href="#">Roller Coasters</a>
17		Work-Variable Forces-Springs	7.4	
18		Potential Energy, Total energy	8.1-8.2	
19		Work Energy Theorem	8.3-8.5	
20				
21	Week 3	<b>Exam 1</b>	<b>Ch. 1-8</b>	<b>Homework set 2 due</b>
22		Center of Mass, Linear Momentum	9.1-9.3	
23		Collisions and Impulse	9.4	
24		Conservation of Linear Momentum	9.5	
25		Collisions	9.6-9.7	
26		Rotational Motion	10.1-10.3	
27		Rotational Inertia and KE	10.4-10.5	
28		Torque and 2nd Law	10.6-10.8	<a href="#">Vector Product of Vectors</a>
29		Rotational and Translational Motion	11.1	
30		Conservation of Angular Momentum	11.5-11.9	



31	Week 4	<b>Exam 2</b>	<b>Ch. 9-11</b>	<b>Homework Set 3 due</b>
32		Newton's Law of Gravitation	13.1-13.3	<a href="#">Gravity</a>
33		Gravitational Potential Energy	13.4-13.5	
34		Keplers Laws	13.6-13.7	<a href="#">NASA-Kepler</a>
35		Oscillations SHM	15.1-15.6	<a href="#">Hookes Law and Oscillation</a>
36		Wave Motion	16.1-16.7	
37		Fluids	14.1-14.3	
38		Bernoulli's Laws	14.4-14.7	
39		<b>Final EXAM</b>	<b>Ch. 1-14</b>	
40				

**Laboratory Schedule:**

<b>PHY 101 Laboratory Schedule</b>		
<b>Textbook: Halliday, Fundamentals of Physics, 12e</b>		
<b>Lab</b>	<b>Lab Topic</b>	<b>Links and References</b>
1	<b>Free Fall Motion Analysis</b>	<a href="#">Free Fall Lab</a>
2	<b>Projectile Motion</b>	<a href="#">Go to Projectle Motion Lab.</a>
3	<b>Friction and Air resistance</b>	<a href="#">Friction Simulation</a>
4	<b>Energy Conservation</b>	<a href="#">Energy Conservation Simulation</a>
5	<b>Collisions and Momentum</b>	<a href="#">Go to Collisions Lab</a>
6	<b>Circular Motion and Rot. Dynamics</b>	<a href="#">Go to Rotational Motion Lab.</a>
7	<b>An Exploration of Dark Matter</b>	<a href="#">Dark Matter Lab</a>
8	<b>The Pendulum and SHM</b>	<a href="#">Go to Pendulum Lab</a>



**Homework assignments from the textbook by Halliday, Resnick, and Walker.**

**Homework Set 1:**

**Chapter 2:** Questions: 1, 3, 4, and 9. Problems: 5, 7, 15, 42, 49

**Chapter 3:** Problems: 3, 5, 8, 15

**Chapter 4:** Problems: 14, 28, 61, 64

**Homework Set 2:**

**Chapter 5:** Problems: 6, 24, 54, 63

**Chapter 6:** Problems: 12, 16, 23, 32

**Chapter 7:** Questions: 2, 5, 7. Problems: 20, 30, 32

**Homework Set 3:**

**Chapter 8:** Questions: 2, 4. Problems: 7, 19, 21

**Chapter 9:** Questions: 5, 8. Problems: 2, 13, 50,

**Chapter 10:** Problems: 9, 29, 40, 41

**Chapter 11:** Problems: 12, 49, 53

**Homework Set 4:**

**Chapter 12:** Problems: 3, 13, 17

**Chapter 13:** Questions: 3, 4, 10. Problems: 12, 13, 20, 47, 50,

**Chapter 15:** Questions: 2, 7. Problems: 21, 33, 41