



**Shih Chien University**  
**STP Program (July 01-Aug 02)**  
**PHY101 Introduction to Mechanics with Lab**  
**Course Outline**

**Course Code: PHY 101**

**Instructor: Roberto Vega**

**Home Institution: Southern Methodist University**

**Class Hours: 7:00 pm – 9:00 pm (China Standard Time)**

**Meeting Days: M-F (synchronous via Zoom)**

**Office Hours: Fridays 10:00 am – 12:00 am (China Standard time, via Zoom)**

**TA Discussion Session: (10 hrs) TBA**

**Email: rvega@smu.edu**

**Credits: 4**

**Class Hours:**

This course will have 144 class hours, including 50 lecture hours, professor 30 office hours, 10-hour TA discussion sessions, 10-hour review sessions, 24 laboratory hours, 20-hour extra classes.

**Prerequisites: N/A**

**Academic Inquiry: Shih Chien University**  
**Disclaimer: Course schedule is subject to change.**



### **Course Description:**

This course will introduce Classical Mechanics, the precise description of motion and the causes of change of motion. Thermodynamics and Fluids will be introduced.

### **Course Objectives:**

1. Students will be able to develop quantitative models appropriate to problems in Physics.
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.

### **Required Course Materials:**

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

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### Grading & Evaluation:

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

### Grading System (1 ~ 100):

Quality Points	Grade	Percentage %
4	A	80-100
3	B	70-79
2	C	60-69
1	D	50-59
0	E	0-49

### Course Schedule:

<b>PHY 101 Course Syllabus SUMMER 2024 (Jul 1 - Aug 2) Textbook: Halliday, Fundamentals of Physics, 12e</b>				
Lecture	Date	Lecture Topic	Text Reading	Helpful Links
1	7/1	Introduction	1.1-1.3	
2		Motion in One Dimension, Velocity	2.1.-2.2	<a href="#">1-D Kinematics</a>
3	7/2	Motion in One Dim., Acceleration	2.3-2.4	<a href="#">Free Fall</a>
4		Motion in One Dimension - Free Fall	2.5	
5	7/3	Vectors	3.1-3.3	<a href="#">Vector Algebra</a>
6		Motion in Two-Dimensions	4.1-4.3	

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7	7/4	Projectile Motion	4.4	<a href="#">Projectile Motion</a>
8		Circular Motion	4.5	<a href="#">Circular Motion</a>
9	7/5	Forces and Newton's Laws	5.1-5.2	
10		<b>TA Discussion and Review</b>	Ch. 1-4	
11	7/8	<b>Exam 1</b>	Ch. 1-4	<b>Homework set 1 due</b>
12		Newton's Laws Applications	5.3	
13	7/9	Newton's Laws Applications	5.3	
14		Resistance and Newton's Laws	6.1-6.2	
15	7/10	Drag Force	6.2	
16		Circular Motion and Force	6.3	
17	7/11	Work	7.1-7.2	<a href="#">Scalar Product of Vectors</a>
18		Work and Kinetic Energy	7.2	<a href="#">Roller Coasters</a>
19	7/12	Work and Gravity	7.3	
20		<b>TA Discussion and Review</b>	Ch. 5-7.3	
21	7/15	<b>Exam 2</b>	Ch. 5-7.3	<b>Homework set 2 due</b>
22		Work-Variable Forces-Springs	7.4	
23	7/16	Potential Energy, Total energy	8.1-8.2	
24		Work Energy Theorem	8.3-8.5	
25	7/17	Center of Mass, Linear Momentum	9.1-9.3	
26		Collisions and Impulse	9.4	

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27	7/18	Conservation of Linear Momentum	9.5	
28		Collisions	9.6-9.7	
29	7/19	Rotational Motion	10.1-10.3	
30		Rotational Inertia and KE	10.4-10.5	
31	7/22	<b>TA Discussion and Review</b>	Ch. 7.4-10.5	
32		<b>Exam 3</b>	Ch. 7.4-10.5	<b>Homework Set 3 due</b>
33	7/23	Torque and 2nd Law	10.6-10.8	<a href="#">Vector Product of Vectors</a>
34		Rotational and Translational Motion	11.1	
35	7/24	Angular Momentum	11.5-11.7	
36		Conservation of Angular Momentum	11.8	
37	7/25	Gyroscopes	11.9	
38		Newton's Law of Gravitation	13.1-13.3	<a href="#">Gravity</a>
39	7/26	Gravitational Potential Energy	13.4-13.5	
40		<b>TA Discussion and Review</b>	Ch. 10.6-13.5	
41	7/29	Keplers Laws	13.6-13.7	<b>Homework Set 4 due</b>
42		Oscillations SHM	15.1-15.6	<a href="#">Hookes Law and Oscillation</a>
43	7/30	Wave Motion	16.1-16.3	
44		The Wave Equation	16.4	
45	7/31	Standing Waves and Resonance	16.7	
46		Thermodynamics	18.1-18.4	
47	8/1	The First Law of Thermodynamics	18.5-18.6	
48		Fluids	14.1-14.7	
49	8/2	<b>Final Exam</b>		<b>Homework Set 5 due</b>
50				

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## Laboratory Schedule

<b>PHY 101 Laboratory Schedule SUMMER 2024 (Jul 1 - Aug 2)</b>			
<b>Textbook: Halliday, Fundamentals of Physics, 12e</b>			
<b>Lab</b>	<b>Date</b>	<b>Lab Topic</b>	<b>Links and References</b>
1	7/4	<b>Free Fall Motion Analysis</b>	<a href="#">Free Fall Lab</a>
2	7/5	<b>Projectile Motion</b>	<a href="#">Go to Projectle Motion Lab.</a>
3	7/11	<b>Friction and Air resistance</b>	<a href="#">Friction Simulation</a>
4	7/16	<b>Energy Conservation</b>	<a href="#">Energy Conservation Simulation</a>
5	7/18	<b>Collisions and Momentum</b>	<a href="#">Go to Collisions Lab</a>
6	7/24	<b>Circular Motion and Rot. Dynamics</b>	<a href="#">Go to Rotational Motion Lab.</a>
7	7/26	<b>An Exploration of Dark Matter</b>	<a href="#">Dark Matter Lab</a>
8	7/29	<b>The Pendulum and SHM</b>	<a href="#">Go to Pendulum Lab</a>
9	7/30	<b>Coupled Oscillations</b>	<a href="#">Coupled Osc. Lab</a>

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