AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)

Faculty of Science and Information Technology

Department of Physics

Undergraduate Program

Spring 2021-2022

COURSE OUTLINE: PHYSICS 1 LAB

I. Course Code and Title:
PHY 1102 [Physics 1 Lab]

II. Credit:
1 credit (3 hours per week)

III. Nature:
Core Course for Physics

IV. Prerequisite:
Students enrolled in Physics 1 theory course.

V. Mission:
AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB) is committed to provide quality and excellent computer-based academic programs responsive to the emerging challenges of the time. It is dedicated to nurture and produce competent world class professional imbued with strong sense of ethical values ready to face the competitive world of arts, business, science, social science and technology.

VI. Vision:
AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB) envisions promoting professionals and excellent leadership catering to the technological progress and development needs of the country.

1. Course Objectives and Course Summary:

The goal of this course is to reinforce information presented during course lectures by providing students "hands-on" opportunities to explore the concepts and principles of physics taught in the Physics 1 course through the following experimental works:

- Determination of the acceleration due to gravity by using a simple pendulum, temperature coefficient of the material of a wire.
- Study of projectile motion and collision.
- Verification of Newton's second law of motion, Ohm's law of resistance, equivalent resistance for series and parallel connections.
- Construction of RC circuit and determination of different parameters related with the circuit.

2. Course Outcomes (CO):

At the end of this course, students will be able to:

CO 1	Understand some basic laws and concepts of Physics
CO 2	Design experimental setup
CO 3	Analyze data to obtain result
CO 4	Draw graphs in Excel and extract results from them
CO 5	Evaluate the results of an experiment

3. Topics to be covered in Laboratory Classes:

Time Frame	Topics	Specific Outcomes	Suggested Activities	Alignment to CO
WEEK 1	Introduction to Physics Lab	Purpose of Physics Lab, how to conduct the experiment and write a good lab report.	Discussion on basics of Physics lab, demonstration of report writing for Physics lab, graph plotting in Excel, different parts of a lab report and how to write them efficiently.	CO 1 CO 2 CO 3
WEEK 2	Acceleration due to Gravity	Estimate the value of acceleration due to gravity in the lab	Understand the relation between time period and length of a simple pendulum, way to find the regression line by the linear least square regression method, construct a simple pendulum and determine its time periods for different lengths, apply the linear least square method to estimate the value of acceleration due to gravity, also compare the result with the result of graph in Excel.	CO 1 CO 2 CO 3 CO 4 CO 5
WEEK 3	Newton's Second Law of Motion	Verification of Newton's second law of motion	Theoretically understand Newton's Second Law, Construct an Atwood Machine and establish the relationship between mass difference and acceleration by plotting a graph in Excel	CO 1 CO 2 CO 3 CO 4
WEEK 4	Projectile Motion, Collision	Study of the projectile motion and collision of a ball.	Understand the theory of Projectile motion and collision, Construct a simple set up to observe projectile motion and collision, determine different related values	CO 1 CO 2 CO 3
WEEK 5	**Midterm Lab Exam**			
WEEK 6	**Midterm Exam**			
WEEK 7	Ohm's law, Equivalent Resistance for Series and Parallel Combinations	To determine unknown resistances by applying Ohm's law	Understand how unknown resistance can be determined from the graph of Ohm's law, construct simple circuit with one resistance and two resistances (series and parallel combinations) to take readings for current and voltage, Plot graphs in Excel to determine unknown resistances	CO 1 CO 2 CO 4 CO 5
WEEK 8	Temperature Coefficient of Resistance of Metals	To determine the temperature coefficient of resistance of the material of a conducting wire	To understand the concept of temperature coefficient of resistance of metals, design a simple circuit to see the effect of temperature on resistance for a conducting wire, analyzing the data to calculate the temperature	CO 1 CO 2 CO 3

			coefficient of resistance of the material of the wire	
WEEK 9	RC circuit	To determine the RC time constant of an RC circuit	Understand the charging and discharging of a capacitor, concept of time constant of an RC circuit, construct an RC circuit, observe the charging and discharging of a capacitor and plot them in graphs, determine the value of RC time constant from another graph	CO 1 CO 2 CO 3 CO 4 CO 5
WEEK 10	**Review Class**			
WEEK 11	**Final term Lab Exam**			
WEEK 12	**Final Exam**			

4. Assessment Pattern:

- **Attendance and Performance:**
  Students have to come to the online lab on time, their prelab work and lab work have to perform according to the lab manuals. Student's punctuality, ability to work as groups will be assessed individually in this part. Total 10 marks will be for each term for this part.
- **Lab Report:**
  Students have to submit one lab report per group. Each lab report will contain 15 marks and total 45 marks for each term. The assessment will be based on students' ability to understand the theory, design the experiment, analyze the data to obtain the result.
- **Viva:**
  In the lab exam week, individual viva will be taken as lab exam based on outcomes of the labs. The marks for this part is 25 for each term. The assessment will be based on student's individual ability to understand the theory and procedure of the labs, development of analyzing and evaluation power, creativity to solve new problems.
- **Mid/Final Term Assessment:**
  As the term exam one individual MCQ based Quiz will be taken. The marks for this part is 20 for each term. The assessment will be based on student's individual ability to remember, understand and apply the theory and experimental knowledge related with the labs, development of analyzing and evaluation power.

CIE- Continuous Internal Evaluation (55 Marks)

Bloom's Category Marks (out of 50)	Attendance and Performance (10)	Lab Reports (45)
Remember		
Understand		20
Apply	10	10
Analyze		10
Evaluate		5
Create		

MFA- Mid/Final Assessment (45 marks)

Bloom's Category Marks (out of 50)	Viva (25)	Quiz (20)
Remember		5
Understand	10	5
Apply		5
Analyze	5	3
Evaluate	5	2
Create	5	

5. Evaluation and Grading System:

The evaluation system will be strictly followed as par the AIUB grading policy. The following grading system will be strictly followed in this Lab class.

Mark Distribution:

Marking system For Laboratory Classes (Midterm and Final term)	
Attendance and Performance	10%
Lab Report	45%
Lab Viva	25%
Mid/Final Term Assessment	20%
Total	100%
Final Grade/ Grand Total	
Midterm	40%
Final Term	60%
Grand Total	100%

Grading Policy:

Letter	Grade Point	Numerical %
A+	4.00	90-100
A	3.75	85-<90
B+	3.50	80-<85
B	3.25	75-<80
C+	3.00	70-<75
C	2.75	65-<70
D+	2.50	60-<65
D	2.25	50-<60
F	0.00	<50 (Failed)

6. Textbook/ References

- Practical Physics- Dr. Giasuddin Ahmed and Md Shahabuddin.
- Fundamentals of Physics (10th edition)- Halliday, Resnick and Walker.
- Lab Manuals, Report Template, etc. (will be uploaded in the Microsoft Teams and AIUB portal).

7. Verification

Prepared by _____ Md. Saiful Islam Senior Assistant Professor Course Convener Date: January 18, 2022	Checked and certified by: _____ Date: _____	Approved by: _____ Date: _____
	Moderated by: _____ Date: _____	Moderated by: _____ Date: _____