



Course Specification

(Bachelor)

Course Title: **Thermal Physics & mechanics Laboratory**

Course Code: **PHY 1283**

Program:
Bachelor of Science in Physics

Department: **Physics**

College: **Science**

Institution: **Imam Mohammad Ibn Saud Islamic University**

Version: **4**

Last Revision Date: **26/09/2024**



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A. General information about the course:

1. Course Identification

1. Credit hours: (2)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (Level 4/ Year 2)

4. Course General Description:

This course is designed to aid students in the development of core practical skills in Physics. The course includes a series of experiments exploring fundamental concepts in thermal physics and mechanics. Every class will have a short lecture introducing the procedures, concepts, formulas and instructions relevant to the experiment. The lecture will also cover what is expected in the lab-report; don't be late. Attendance and participation is mandatory. Experiments will usually be performed in groups, but each student will turn in an individual lab report.

5. Pre-requirements for this course (if any):

Thermal physics, PHY 1230

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

- Observe and analyze physical data relevant to some of the experiments in thermal physics and mechanics.
- Provide students with a thorough understanding of the basic concepts of physics and the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.
- Develop the student's mathematical ability to manipulate formulae and derive correct numerical solutions that can be measured in the real world.
- Instruct students in the competent use of laboratory equipment to collect and record data, apply relevant mathematical models and perform required computations, and present the derived results as an application of a measured observation of the physical world.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		



No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	0
2.	Laboratory/Studio	30
3.	Field	0
4.	Tutorial	30
5.	Others (specify)	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the scientific method of inquiry to draw conclusions based on verifiable evidence such as expansion of solids and liquids.	K1;K2	<ul style="list-style-type: none"> Supervision by lab instructor Submitting an individual lab report. Performing lab. experiments at the scheduled times.	<ul style="list-style-type: none"> Participation. Report evaluation. Lab experiment check. Exams.
1.2	Describe the theoretical bases of specific heat of solids, specific vaporization heat of liquids and latent heat of solids experiments.	K1;K2	<ul style="list-style-type: none"> Supervision by lab instructor Submitting an individual lab report. Performing lab. experiments at the scheduled times.	<ul style="list-style-type: none"> Discussion. Report evaluation. Lab experiment check. Exams.
1.3	Describe the concepts of the law experiments in thermal Physics and mechanics.	K1;K2	<ul style="list-style-type: none"> Supervision by lab instructor Submitting an individual lab report. 	<ul style="list-style-type: none"> Participation. Report evaluation.



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Performing lab. experiments at the scheduled times.	<ul style="list-style-type: none"> Lab experiment check. Exams.
2.0	Skills			
2.1	Analyze experiments according to the plan besides the learning from lab lecture.	S1; S2	<ul style="list-style-type: none"> Using the multimedia and visual materials, Lab manual and the theoretical bases of the course. Interaction between students in the lab course community and discussions in the lab. 	Analyze experiments according to the plan besides the learning from lab lecture.
2.2	Explain and use information from the output of experiment to draw conclusions.	S2; S3	Experiments setting up, data recording and calculations based on lab manual and lectures (co-requisites).	Explain and use information from the output of experiment to draw conclusions.
2.3	Summarize conclusions and write reports.	S3; S4	<ul style="list-style-type: none"> Experiments setting up, data recording and calculations based on lab manual and lectures (co-requisites). 	<ul style="list-style-type: none"> Summarize conclusions and write reports.
3.0	Values, autonomy, and responsibility			
3.1	Show the collaboration and inter-professionalism in class discussions or team works, as well as solve problems independently.	V1, V2, V3	<ul style="list-style-type: none"> Small team tasks Open discussion at classroom. Office hours. 	<ul style="list-style-type: none"> Participation. Homework. Mini-project(s).

C. Course Content

No	List of Topics	Contact Hours
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1.	Experiment 1: Inscription in the lab and distribution of the group.	5
2.	Experiment 2: Path-time diagrams of rotational motion: Measurements the angular velocity, angular acceleration.	5
3.	Experiment 3: Conservation of Energy by using Maxwell's Wheel.	5
4.	Experiment 4: Laws of Gyroscopes / 3-axis gyroscope.	5
5.	Experiment 5: Damped and Forced Oscillations – Pohl's Torsional Pendulum: part 1.	5
6.	Experiment 6: Damped and Forced Oscillations – Pohl's Torsional Pendulum: part 2.	5
7.	Experiment 7: Determining the Specific Heat Capacity of Solids.	5
8.	Experiment 8: The thermal expansion of solid bodies : Measuring the linear thermal expansion.	5
9.	Experiment 9: Boyle s law: verification of Boyle s law , and measuring the atmospheric pressure.	5
10.	Experiment 10: Determining the volumetric expansion coefficient of water as liquid.	5
11.	Experiment 11: The latent heat of water	5
12.	Revision	5
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class Activities (class quizzes, homework, solving problems, etc.....)	weekly	35 %
2.	Midterm Exam 1	6thweek	7.5 %
4.	Midterm Exam 2	11thweek	7.5 %
5.	Final Exam	15thweek	50 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	
Supportive References	<p>-Laboratory Manual supplied by the Department of Physics.</p> <p>- Laboratory Manual is available at the website of the Department of Physics.</p> <p>Multimedia associated with The Lab manual and the relevant websites</p>





Electronic Materials	https://units.imamu.edu.sa/colleges/en/science/Pages/default.aspx
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- Classrooms. - Labs.
Technology equipment (projector, smart board, software)	- Classroom equipped with a whiteboard and a projector.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	- Students - Second examiner	- Indirect (The students complete the evaluation forms at the end of term. Final exam is evaluated by the second examiner)
Effectiveness of Students assessment	- Instructors	- Direct (exams, HW, project, ...)
Quality of learning resources	- Faculty - Students	- Indirect (surveys)
The extent to which CLOs have been achieved	- Instructors - Program Leaders	- Direct (excel sheet)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Quality Unit-Physics Department
REFERENCE NO.	Department council No. 06
DATE	26/09/2024



