

EASTERN MEDITERRANEAN UNIVERSITY DEPARTMENT OF PHYSICS

COURSE CODE	PHYS306	COURSE LEVEL	Third Year
COURSE TITLE	MODERN PHYSICS AND QUANTUM LABORATORY	COURSE TYPE	Area Core
CREDIT VALUE	(0,3,0) 1	ECTS VALUE	6 credits
PREREQUISITES	None	COREQUISITES	None
DURATION OF COURSE	One Semester	SEMESTER AND YEAR	Spring 2022-2023
WEBPAGES	http://staff.emu.edu.tr/huriyegursel , https://lms22-23spring.emu.edu.tr/course/view.php?id=2706		

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CATALOGUE DESCRIPTION

This course aims to provide the necessary tools for gaining a practical experience on topics of modern physics and quantum mechanics. In addition to the details of experimental procedures, the course aims to offer guidance on how to analyze collected data (both manually and with the aid of Excel). Different data analysis methodologies will be investigated, and students will be directed in making comments on the leading outcomes of doing so. The importance of error propagation and categorization of different error types will also be pointed out.

AIMS & OBJECTIVES

Throughout PHYS 306, it is aimed to provide insight and experience on;

- how to measure physical quantities in a laboratory environment,
- recording the measured data in a scientific manner,
- analyzing data both manually and via Excel,
- working on error propagation and thinking of the meaning behind uncertainties,
- conducting experiments on subjects related to modern physics and quantum mechanics, and
- presenting an experimental work to a scientific audience.

GRADING CRITERIA	
A (excellent) ~85% and above	Excellent understanding of the concepts and the principles as demonstrated by correct and accurate knowledge and application of theory/laws in solving problems. Response to problems is clear, legible, concise and accurate. Excellent performance.
B (good) ~70% and above	Better than average understanding of the concepts and the principles as demonstrated by correct and accurate knowledge and application of theory/laws in solving problems, but does not have the depth and outstanding quality of an "A". Response to problems is fairly clear, legible, but occasionally contains some inaccuracies. Performance exceeds the minimum requirements.
C (average) ~60 % and above	An average understanding of the concepts and the principles as demonstrated by reasonably correct knowledge and application of theory/laws in solving problems, but doesn't have any depth. Response to problems is reasonably clear, legible, but contains inaccuracies. It reveals a sufficient understanding of the material, but lacks depth in understanding and approach/application. Content and form do not go beyond basic expectations and/or display some substantial errors. Acceptable but non-exceptional performance that does not go beyond the minimum requirements.
D (barely sufficient) ~50% and above	Minimal knowledge and barely sufficient understanding of the concepts and the principles as demonstrated by approximately correct application of theory/laws in solving problems. Response to problems is not very clear and is barely legible, and contains many inaccuracies. It reveals a minimum (confused) understanding of the material, and lacks depth in understanding and approach/application. Content and form do not adequately meet the basic expectations, and/or display significant errors. Performance demonstrates severe problems in one or more areas.
F (fail) Below 50%	Work does not meet the most minimal standards. It reveals no understanding of the material, lack of basic academic skills and knowledge, or completely incomprehensible writing. Performance is not acceptable.
NG nil grade	Not enough information to assign a letter grade.

METHOD OF ASSESSMENT

- 70%** Laboratory Reports (seven reports, 10% each)
- 10%** Problem Set 1 (Data Analysis & Error Propagation)
- 10%** Problem Set 2 (Theoretical Background & Interpretation of the Conducted Experiments)
- 14%** Preparation Mark (seven experiments, 2% each)

IMPORTANT NOTES

Objections: Graded reports will be available for a recheck upon request. According to the regulations of the University, any objections or re-grade requests should be made within a week of the announcement of grades.

Main Textbook (REQUIRED)

EMU Laboratory Manual for PHYS 306

Additional Reading Materials (Not Compulsory, but Recommended)

D. J. Griffiths, "Introduction to Quantum Mechanics," 2nd Edition, Pearson Prentice Hall, Upper Saddle River, New Jersey, 2005

A. Beiser, *Concepts of Modern Physics*, 5th Edition

A. P. Arya, *Elementary Modern Physics*

T. M. Helliwell, *Special Relativity*

A. Einstein, "Zur Elektrodynamik bewegter Körper" published in *Annalen der Physik* (Leipzig), 17 (1905) 891

M. Planck "The Theory of Heat Radiation" (1914), translated into English by Morton Masius

<https://www.nobelprize.org/prizes/physics/1923/millikan/lecture/>

ACADEMIC DISHONESTY

Cheating is copying from others or providing information, written or oral, to others. According to university by-laws cheating is a serious academic dishonesty case punishable with disciplinary action including a letter of official warning and/or suspension from The University for up to one semester. Disciplinary action is written in student records and may appear in transcripts.

PLEASE KEEP THIS COURSE SYLLABUS FOR REFERENCE AS IT CONTAINS IMPORTANT INFORMATION!

		COURSE SCHEDULE
Week	Date	Topics
1	27 February - 03 March	Introduction
2	06-10 March	Workshop
3	13-17 March	Lecture
4	20-24 March	Laboratory Session 1
5	27-31 March	Laboratory Session 2
6	03-07 April	Laboratory Session 3
7	10-14 April	Laboratory Session 4
8	17-21 April	No Lecture
9-10	24Apr - 08 May	Midterm Examination Period
11	08-12 May	Laboratory Session 5
12	15-18 May	No Lecture
13	22-26 May	Laboratory Session 6
14	05-09 June	Laboratory Session 7
15	12-16 June	Laboratory Session 8
16-18	12-26 June	Final Examination Period