مركز الاعتماد وضمان الجودة
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Course Syllabus

1	**Course title**	Practical Physics 4	
2	**Course number**	0352311	
3	**Credit hours**	2	
	Contact hours (theory, practical)	(0, 6)	
4	**Prerequisites/corequisites**	Modern Physics (0302261), Practical Physics-3 (0302215)	
5	**Program title**	Physics	
6	**Program code**	2	
7	**Awarding institution**	The University of Jordan	
8	**School**	Science	
9	**Department**	Physics	
10	**Course level**	3ed year	
11	**Year of study and semester(s)**	2nd Sem 2023/2024	
12	**Other department(s) involved in teaching the course**	None	
13	**Main teaching language**	English	
14	**Delivery method**	☒Face to face learning ☐Blended ☐Fully online	
15	**Online platforms(s)**	☐Moodle ☒Microsoft Teams ☐Skype ☐Zoom ☐Others……	
16	**Issuing/Revision Date**	February 2024	

17 Course Coordinator:

Name: Sami H. Mahmood	Contact hours: 1:00 – 7:00 pm, Sunday, Monday.
Office number: 17	Phone number: 22023
Email: s.mahmood@ju.edu.jo	

18 Other instructors:

Name:

19 Course Description:

At least ten experiments each of six hours per week from the following list: Frank-Hertz experiment; Thermionic emission; The characteristics of Geiger-Muller counter and the absorption of radiation; Statistical nature of nuclear radiation; Millikan's oil-drop experiment; Mechanical oscillator; Photoelectric effect; Measurements of dielectric constants of liquids; Hall effect in a conductor; Diffraction grating and Balmer series; Electron diffraction; Magnetic susceptibility; Black-Body radiation using Thermionic emission.

20 Course aims and outcomes:

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A- Aims:

This lab gives physics student a direct interaction with advanced modern physics concepts. In this lab students get a direct hands-on experience involving advanced concepts of physics such as: the quantization of light, wave-particle duality of electrons, quantization of atomic energy, Statistical nature of nuclear radiation, charge quantization and determination of the elementary electronic charge, blackbody radiation, characteristics of thermionic emission, and the absorption of β- and γ-radiation in matter.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the physics program SLOs, at the successful completion of the physics program, graduates are expected to be able to:

SLO (1) Master professionally a broad set of knowledge concerning the fundamentals in the basic areas of physics: Quantum Mechanics, Classical Mechanics, Electrostatics and Magnetism, Thermal Physics, Optics, Theory of Special Relativity, Mathematical Physics, Electronics.

SLO (2) Apply knowledge of mathematics and fundamental concepts in the basic areas of physics to identify and solve physics related problems.

SLO (3) Utilize computers and available software in both data collections and data analysis.

SLO (4) Utilize standard laboratory equipment, modern instrumentation, and classical techniques to design and conduct experiments as well as to analyze and interpret data.

SLO (5) Develop a recognition of the need and ability to engage in life-long learning.

SLO (6) Demonstrate ability to use techniques, skills, and modern scientific tools necessary for professional practice.

SLO (7) Communicate clearly and effectively in both written and oral forms.

SLO (8) Apply proficiently team-work skills and employ team-based learning strategies.

SLO (9) Apply professional and ethical responsibility to society.

Upon successful completion of this course, students will be able to:

Program SLOs / Course SLOs	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)	SLO (7)	SLO (8)	SLO (9)
1. Be able to discuss and defend their understanding of modern physics concepts.	□							□	
2. Measure some of the basic quantities in modern physics.	□		□						

3. Handle large amount of data using proper techniques and software packages.			□	□					
4. Professional experimental reporting, and scientific data analysis.			□	□		□			
5. Ability to work and communicate with teammates and classmates during the lab sessions.						□	□	□	
6. Proper discussion and referencing of the experimental results.							□		□

21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1		Registration, preparation for the experimental wok						
2		Introduction, Distribution of the students into groups, Assigning the weekly experiments to the groups.	To be able to provide a proper record of the experimental procedures and data analysis, and to estimate experimental uncertainties	Face to face			Oral discussion	Lab Manual + Major experimental and theoretical Physics Text Books

3 - 11		Carrying out an experiment every week	To be able to set up the experiment, perform precise measurements, analyze the data and correlate the results with	Face to face			Oral discussion and experimental report	Lab Manual + Major experimental and theoretical Physics Text Books
			the various phenomena					
Week	**Lecture**	**Topic**	**Intended Learning Outcome**	**Learning Methods (Face to Face/Blended/ Fully Online)**	**Platform**	**Synchronous / Asynchronous Lecturing**	**Evaluation Methods**	**Resources**
12		Makeup week (to do missing experiments)		Face to face			Oral discussion and experimental report	Lab Manual + Major experimental and theoretical Physics Text Books
14		Final Exam		Face to face			Testing the understanding of concepts related to the physical phenomena and the ability to analyze data and estimate uncertainties	

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Lab reports and personal discussions	30%	All experiments	2 – 6	every week	
Oral exam discussion on each experiment for each student.	30%	All experiments	1, 2	every week	
Final Exam	40%	All experiments	1, 3	End of semester	

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):

Each student should have a computer. PCs are also available in the lab for students' use.

The students can use Excel software for data analysis (available in the lab).

The students are listed in Teams for communication with the instructors

24 Course Policies:

A- Attendance policies: Student's should attend every lab session; they cannot miss more than two lab sessions with a proper excuse.

B- Absences from exams and submitting assignments on time: No late assignments are accepted. No absence from the final exam should be justifiable, in which case an alternative evaluation and a makeup exam will be offered.

C- Health and safety procedures: Safety measures should be followed during all lab sessions. High voltage equipment and radioactive sources are common in this lab.

D- Honesty policy regarding cheating, plagiarism, misbehavior: all students are expected to have the highest levels of honesty and no plagiarism is tolerated in any of the lab reports.

E- Grading policy: Every student will be able to see his/her oral evaluation grade and graded reports are returned as soon as possible.

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F- Available university services that support achievement in the course: A fully furnished lab with computer facility for data analysis is available for the students.

25 References:

A- Required book(s), assigned reading and audio-visuals:

[1] Sami Mahmood, Advanced Practical Physics, The University of Jordan, 2012.

B- Recommended books, materials, and media:

[2] University Laboratory Experiments Physics, Vol. 1 – 5, 3rd ed., PHYWE series of publications, (PHYWE SYSTEME GMBH, Gottingen, Germany, 1995).
[3] Adrian C. Melissinos, Experiments in Modern Physics, (Academic Press, New York, 1966).
[4] Philip R. Bevington and D. Keith Robinson, Data Reduction and Error Analysis for the Physical Sciences, 3rd ed., (McGraw-Hill, Boston, 2003)

*Modern Physics textbooks

*C. Kittel, Introduction to Solid State Physics * D. J. Griffiths, Introduction to Quantum Mechanics.

*YouTube and internet resources.

26 Additional information:

Name of Course Coordinator: Sami Mahmood Signature: Sami mahmood Date: 12/6/2024

Head of Curriculum Committee/Department: ---------- Signature: ---------- Head of Department: ---------- Signature: ----------

Head of Curriculum Committee/Faculty: ---------- Signature: ----------

Dean: ---------- Signature: ----------