Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	2023/10/15
	Deans Council Approval Decision Number	265/2024/24/3/2
	The Date of the Deans Council Approval Decision	2024/1/23
	Number of Pages	06

1.	**Course Title**	Physics for Medical and Dental Students
2.	**Course Number**	0329105
3.	**Credit Hours (Theory, Practical)**	3 theory
	Contact Hours (Theory, Practical)	3 theory
4.	**Prerequisites/ Corequisites**	No prerequisites
5.	**Program Title**	BSc. Medicine
6.	**Program Code**	
7.	**School/ Center**	Faculty of Science
8.	**Department**	Department of Physics
9.	**Course Level**	1st year
10.	**Year of Study and Semester (s)**	Fall Semester 2025/2026
11.	**Program Degree**	BSc
12.	**Other Department(s) Involved in Teaching the Course**	-
13.	**Learning Language**	English
14.	**Learning Types**	☑ Face to face learning ☐Blended ☐Fully online
15.	**Online Platforms(s)**	☐Moodle ☑Microsoft Teams
16	**Issuing Date**	October 2025
17.	**Revision Date**	January 2026

18. Course Coordinator:

Name: Dr. Ziad Abu Waar	Contact hours: 11:30-12:30 Sunday, Tuesday and Thursday
Office number: Physics 006	Phone number: 065355000 Ext.: 22063
Email: ziad.abuwaar@ju.edu.jo	

19. Other Instructors:

Faculty Members of the Department of Physics

Riad Shaltaf, Hassan K. Juwhari, Mahmoud I. Jaghoub, Mohammad Hussein, Ahmad Masadeh.

20. Course Description:

Velocity and acceleration; Newton's laws of motion; static equilibrium; work and energy;

temperature and behavior of gases; the first law of thermodynamics; thermal properties of matter;

mechanics of non-viscous fluids; mirrors; lenses: the human eye; radioactivity; interaction of

radiation with matter; radiation units; harmful effects of radiation; applications of radiation in medicine.

21. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

SO1: Identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of Mathematics and Science and/or technical topics to areas relevant to the discipline.

SO2: Formulate or design a system, process, procedure or program to meet desired needs

SO3: Develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions

SO4: Communicate effectively with a range of audiences in oral or written forms and exhibit ethical and professional values.

SO5: Reflect the impact of technical and/or scientific solutions in economic, environmental, and societal contexts.

SO6: Function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

PILO's	*National Qualifications Framework Descriptors*		
	Competency (C)	Skills (B)	Knowledge (A)
1.	☐	☐	☒
2.	☐	☐	☒
3.	☐	☐	☒
4.	☐	☐	☒
5.	☐	☐	☒
6.	☐	☐	☒

* Choose only one descriptor for each learning outcome of the program, whether knowledge, skill, or competency.

22. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Understanding vector algebra.

2. Analyzing 1D motion using Newton's laws of motion (forces on skeleton).

3. Using the energy conservation's principle in analyzing some medical applications.

4. Examining the kinematics and dynamics of rotational motion (tooth extraction).

5. Examining the translational and rotational equilibrium cases (joints and muscles).

6. Analyzing the aspects of fluid statics and fluid dynamics (blood pressure and circulation).

7. Define key terms such as reflection, refraction, refractive index, real image, virtual image, focal length, and critical angle.

8. Studying the basic concepts in nuclear medicine and the subject of dosimetry.

9. Studying the basic concepts of geometrical optics (Ophthalmology).

Course ILOs #	The learning levels to be achieved						Competencies
	Remember	Understand	Apply	Analyse	Evaluate	Create	
1.	✓	✓					
2.		✓	✓	✓	✓		
3.	✓	✓	✓	✓			

4.	✓		✓		✓		✓				
5.			✓		✓		✓		✓			
6.			✓		✓		✓		✓			
7.	✓		✓		✓						
8.	✓		✓		✓						
9.	✓		✓		✓						

23. The matrix linking the intended learning outcomes of the course -CLO's with the intended learning outcomes of the program -PILOs:

PILO's * \ CLO's	1	2	3	4	5	6	Descriptors** A	B	C
1. Understanding vector algebra.	✓	✓					✓		
2. Analyzing 1D motion using Newton's laws of motion (forces on skeleton).	✓	✓					✓		
3. Using the energy conservation's principle in analyzing some medical applications.	✓	✓					✓		
4. Examining the kinematics and dynamics of rotational motion (tooth extraction).	✓	✓					✓		
5. Examining the translational and rotational equilibrium cases (joints and muscles).	✓						✓		
6. Analyzing the aspects of fluid	✓	✓					✓		

statics and fluid dynamics (blood pressure and circulation).						
7. Define key terms such as reflection, refraction, refractive index, real image, virtual image, focal length, and critical angle.	✓	✓			✓	
8. Studying the basic concepts in nuclear medicine and the subject of dosimetry.	✓	✓			✓	
9. Studying the basic concepts of geometrical optics (Ophthalmology).	✓	✓			✓	

*Linking each course learning outcome (CLO) to only one program outcome (PLO) as specified in the course matrix.

**Descriptors are determined according to the program learning outcome (PLO) that was chosen and according to what was specified in the program learning outcomes matrix in clause (21).

24. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1	**Describing Motion: Kinematics in One Dimension** 1-5 Units, Standards,	ILO (1,2)	Face To Face	Teams	Synchronous	Discussion	
	1.2		ILO (1,2,)	Face To Face	Teams	Synchronous	Discussion	
	1.3		ILO (1,2)	Face To	Teams	Synchronous	Discussion	

		and the SI System		Face			
2	2.1	1-6: Converting Units	ILO (1,2)	Face To Face	Teams	Synchronous	Discussion
	2.2	1-8: Dimensions and Dimensional Analysis	ILO (1,2)	Face To Face	Teams	Synchronous	Discussion
	2.3	2-1 Reference Frames and Displacement 2-2 Average Velocity 2-3 Instantaneous Velocity 2-4 Acceleration	ILO (1,2)	Face To Face	Teams	Synchronous	Discussion
3	3.1	**Kinematics in Two Dimensions: Vectors**	ILO (1,2,3)	Face To Face	Teams	Synchronous	Discussion
	3.2	3.1 Vectors and Scalars	ILO (1,2,3	Face To Face	Teams	Synchronous	Discussion
	3.3	3.2 Addition of Vectors☐☐Graphical Methods 3.3 Subtraction of Vectors, and Multiplication of a Vector by a Scalar 3.4 Adding Vectors by Components	ILO (1,2,3,5)	Face To Face	Teams	Synchronous	Discussion
4	4.1	**Dynamics: Newton's Laws of Motion**	ILO (1,2,3,5)	Face To Face	Teams	Synchronous	Discussion
	4.2	4.1 Force 4.2 Newton's First Law of Motion	ILO (1,2,3)	Face To Face	Teams	Synchronous	Discussion
	4.3	4.3 Mass	ILO (1,2,3)	Face To Face	Teams	Synchronous	Discussion,

		4.4 Newton's Second Law of Motion						
		4.5 Newton's Third Law of Motion						
		4.6 Weight☐☐the Force of Gravity; and the Normal Force						
		4.7 Solving Problems with Newton's Laws: Free-Body Diagrams						
		4.8 Problems Involving Friction, Inclines						
	5.1	**Work and Energy**	ILO (1,2,3)	Face To Face	Teams	Synchronous		Discussion
	5.2	6.1 Work Done by a Constant Force	ILO (1,2,3)	Face To Face	Teams	Synchronous		Discussion
5	5.3	6.3 Kinetic Energy, and the Work-Energy Principle	ILO (1,2,3)		Teams	Synchronous		
		6.4 Gravitational Potential Energy (Elastic Energy is excluded)						
		6.5 Conservative and Nonconservative Forces						
		6.6 Mechanical Energy and its Conservation						
		6.7 Problem Solving Using Conservation of Mechanical Energy						
		6.8 Other Forms of Energy;						
		6.9 Energy Conservation with		Face To Face				Discussion

		Dissipative Forces: Solving Problems 6.10 Power					
6	6.1	**Ch7: Linear Momentum** 7-8 Center of Mass (CM) 7-9 CM for the Human Body Ch8: Rotational Motion 8.4 Torque	ILO (1,2,3)	Face To Face	Teams	Synchronous	Discussion
	6.2		ILO (1,2,3)	Face To Face	Teams	Synchronous	Discussion
	6.3		ILO (1,2,,4,5)	Face To Face	Teams	Synchronous	Discussion
7	7.1		ILO (1,2,,4,5)	Face To Face	Teams	Synchronous	Discussion
	7.2		ILO (1,2,,4,5)	Face To Face	Teams	Synchronous	Discussion
	7.3		ILO (1,2,,4,5)	Face To Face	Teams	Synchronous	Discussion
8	8.1	**Static Equilibrium: Elasticity and Fracture** 9-1 The Conditions for Equilibrium 9–2 Solving Statics Problems 9–3 Applications to Musclesand Joints 9–4 Stability and Balance 9–5 Elasticity; Stress and Strain 9–6 Fracture	ILO(1,2,,4,5)	Face To Face	Teams	Synchronous	Discussion
	8.2		ILO(1,2,,4,5)	Face To Face	Teams	Synchronous	First exam
	8.3		ILO(1,2,,4,5)	Face To Face	Teams	Synchronous	Discussion
9	9.1	Fluids	ILO(1,3,6)	Face To Face	Teams	Synchronous	Discussion

	9.2	10.1 Phases of Matter	ILO(1,3,6)	Face To Face	Teams	Synchronous		Discussion	
		10.2 Density and Specific Gravity	ILO(1,3,6)		Teams	Synchronous			
		10.3 Pressure in Fluids							
		10.4 Atmospheric Pressure and Gauge Pressure							
		10.5 Pascal's Principle							
	9.3	10.6 Measurements of Pressure; Gauges and the Barometer							
		10.7 Buoyancy and Archimedes' Principle							
		10.8 Fluids in Motion; Flow Rate and the Equation of Continuity							
		10.9 Bernoulli's Equation							
		10.10 Applications of Bernoulli's Principle:Torricelli, Airplanes, Blood Flow							
		10–12 Flow in Tubes: Poiseuille's Equation, Blood Flow		Face To Face				Discussion, homework	
10	10.1		ILO(1,3,6)	Face To Face	Teams	Synchronous		Discussion	
	10.2		ILO(1,3,6)	Face To	Teams	Synchronous		Discussion	

				Face				
	10.3		ILO(1,3,6)	Face To Face	Teams	Synchronous	Discussion, homework	
11	11.1	LIGHT: GEOMETRIC OPTICS	ILO(1,7)	Face To Face	Teams	Synchronous	Discussion	
	11.2	23-1: The Ray Model of Light	ILO(1,7)	Face To Face	Teams	Synchronous	Discussion	
	11.3	23-4: Index of Refraction	ILO(1,7)	Face To Face	Teams	Synchronous	Discussion	
12	12.1	23-5: Refraction: Snell's Law	ILO(1,7)	Face To Face	Teams	Synchronous	Discussion	
	12.2	23-6: Total Internal Reflection; Fiber Optics	ILO(1,7)	Face To Face	Teams	Synchronous	Second exam	
	12.3	23-7: Thin Lenses; Ray Tracing 23-8: The Thin Lens Equation	ILO(1,,7)	Face To Face	Teams	Synchronous	Discussion	
13	13.1	Nuclear Physics and Radioactivity	ILO(8,9)	Face To Face	Teams	Synchronous	Discussion	
	13.2	30-1 Structure and Properties of Nucleus	ILO(8,9)	Face To Face	Teams	Synchronous	Discussion	
	13.3	30-3 Radioactivity 30-6 Gamma Decay 30-8 Half-Life and Rate of Decay 30-9 Calculations Involving Decay Rates and Half-Life	ILO(8,9)	Face To Face	Teams	Synchronous	Discussion, homework	
14	14.1	Nuclear Energy; Effects and Uses of Radiation	ILO(8,9)	Face To Face	Teams	Synchronous	Discussion	
	14.2	31.4 Passage of Radiation Through Matter; Biological Damage	ILO(8,9)	Face To Face	Teams	Synchronous	Discussion	
	14.3		ILO(8,9)	Face To Face	Teams	Synchronous	Discussion	

		31.5 Measurement of Radiation □□Dosimetry 31.6 Radiation Therapy 31–8 Emission Tomography:PET and SPECT 31–9 Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI)						
15	15.1	Review	ILO(1-9)	Face To Face	Teams	Synchronous	Discussion	
	15.2	Review	ILO(1-9)	Face To Face	Teams	Synchronous	Discussion	
	15.3	Review	ILO(1-9)	Face To Face	Teams	Synchronous	Final exam	

25. Evaluation Methods:

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

Evaluation Activity	*Mark wt.	CILO's					
		1	2	3	4	5	6
First Exam	30%	✓	✓	✓	✓	✓	
Second Exam	20%			✓	✓	✓	✓
Final Exam	50%	✓	✓	✓	✓	✓	✓
Total 100%	100%						

* According to the instructions for granting a Bachelor's degree.

**According to the principles of organizing semester work, tests, examinations, and grades for the bachelor's degree.

First exam specifications table*

	No. of questions/ cognitive level						No. of questions per CLO	Total exam mark	Total no. of questions	CILO/ Weight	CILO no.
	Create %10	Evaluate %10	analyse %10	Apply %20	Understand %20	Remember %30					
		1			1	1	3	100	15	20%	1
		1		1		1	3	100	15	20%	2
		1		1		1	3	100	15	20%	3
	1			1		1	3	100	15	20%	4
		1		1		1	3	100	15	20%	5
											6

Final exam specifications table

	No. of questions/ cognitive level						No. of questions per CLO	Total exam mark	Total no. of questions	CILO/ Weight	CILO no.
	Create %10	Evaluate %10	analyse %10	Apply %20	Understand %20	Remember %30					
		1			1	1	3	100	20	15%	1
		1		1		1	3	100	20	15%	2
		1		1		1	3	100	20	15%	3
	1			1		1	3	100	20	15%	4
		1	1	1		1	4	100	20	20%	5
	1		1	1		1	4		20	20%	6

26. Course Requirements:

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

The students are expected to have internet connection and a calculator

27. Course Policies:

A- Attendance policies:

Students are expected to attend all class sessions. If a student cannot attend a class session, the teacher must be notified prior to that. For the university's rules and regulations, the student's total absences must not exceed 15 % of the total class hours. Please refer to the University of Jordan student Handbook for further explanation.

B- Absences from exams and submitting assignments on time:

a. Failure in attending a course exam other than the final exam will result in zero mark unless the student provides an official acceptable excuse to the instructor who approves a make up exam.
b. Failure in attending the final exam will result in zero mark unless the student presents an official acceptable excuse to the Dean of his/her faculty who approves an incomplete exam, normally scheduled to be conducted during the first two weeks of the successive semester.

C- Health and safety procedures:

We don't have any policy at the moment considering the safety procedures, nevertheless, the instructor in each session has to give a general safety instructions for the student.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Cheating, plagiarism, misbehavior are attempts to gain marks dishonestly and includes; but not limited to:

- Copying from another student's work.
- Using materials not authorized by the institute.
- Collaborating with another student during a test, without permission.
- Knowingly using, buying, selling, or stealing the contents of a test.
- Plagiarism which means presenting another person's work or ideas as one's own, without attribution.
- Using any media (including mobiles) during the exam.

E- Grading policy:

Grades will be awarded based on the statistical distribution of marks out of 100%

F- Available university services that support achievement in the course:

- Faculty members website

E-Learning website

28. References:

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

Douglas C. Giancoli, "PHYSICS: PRINCIPLES WITH APPLICATIONS".

Seventh Edition, Pearson, 2015.

B- Recommended books, materials, and media:
- Joseph W. Kane and Morton M. Sternheim, "Physics", 3rd Edition, (John Wiley & Sons, 1988).
- Raymond A. Serway and John W. Jewett Jr., "Physics For Scientists and Engineers with Modern Physics" 7th Edition, (Thomson Learning, Belmont, CA, USA, 2007).

29. Additional information:

Name of the Instructor or the Course Coordinator: ……… Ziad Abu Waar …………	Signature: … Ziad …	Date: 5/10/2025
Name of the Head of Quality Assurance Committee/ Department ………………………………………………	Signature: ……………..………………	Date: ……..…………
Name of the Head of Department ………………………………………………	Signature: ……………..………………	Date: ……..…………
Name of the Head of Quality Assurance Committee/ School or Center ………………………………………..	Signature: ……………..………………	Date: ……..…………
Name of the Dean or the Director	Signature:	Date:

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