مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

Course Syllabus

1	**Course title**	**Physics for Medical and Dental**
2	**Course number**	**0342105**
3	**Credit hours**	**3, 0**
	Contact hours (theory, practical)	**3, 0**
4	**Prerequisites/corequisites**	
5	**Program title**	**Bachelor in Medicine**
6	**Program code**	
7	**Awarding institution**	**The University of Jordan**
8	**School**	**Science**
9	**Department**	**Physics**
10	**Course level**	**100 level**
11	**Year of study and semester(s)**	**2023 – 2024 , Fall semester**
12	**Other department(s) involved in teaching the course**	
13	**Main teaching language**	**English**
14	**Delivery method**	**In person**
15	**Online platforms(s)**	**MS Teams, e-learning**
16	**Issuing/Revision Date**	

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17 Course Coordinator:

Name: Riad Shaltaf	Contact hours: Sun-Tues-Thur 9:30-10:30
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18 Other instructors:

Name: Mohammad Hussein
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Name: Sami Mahmood
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Name: Mahmoud I. Jaghoub
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Name: Ziad Abu Waar

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Name: Dia Arafah

Office number:

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19 Course Description:

As stated in the approved study plan.

20 Course aims and outcomes:

A- Aims:

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. 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. **Studying the basic concepts in nuclear medicine and the subject of dosimetry.**	✓	✓							
8. **Studying the basic concepts of geometrical optics (Ophthalmology)**	✓	✓							

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21. Topic Outline and Schedule:

C

PHYSICS DEPARTMENT PHYSICS FOR MEDICAL AND

First SEMESTER (2022 – 2023) DENTAL Students (0342105)

Course Content:

Chapter no.	Sections	Suggested Problems
1+2 **0.5 week**	**Describing Motion: Kinematics in One Dimension** 1-5 Units, Standards, and the SI System 1-6: Converting Units 1-8: Dimensions and Dimensional Analysis 2-1 Reference Frames and Displacement 2-2 Average Velocity 2-3 Instantaneous Velocity 2-4 Acceleration	**Ch1: 17, 21, 33, 34, 48** **Ch2: 5, 6, 7 , 9, 11, 17 , 20 , 21**

3 **1 week**	**Kinematics in Two Dimensions: Vectors** 3.1 Vectors and Scalars 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	**1, 3, 8, 12**	
4 **2 weeks**	**Dynamics: Newton's Laws of Motion** 4.1 Force 4.2 Newton's First Law of Motion 4.3 Mass 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	**3,11,28, 31** **36, 37, 45, 47,** **61**	
6 **2 weeks**	**Work and Energy** 6.1 Work Done by a Constant Force 6.3 Kinetic Energy, and the Work-Energy Principle 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	**9, 10, 18, 23, 28, 36, 41, 44, 55, 57**	

	6.8 Other Forms of Energy; 6.9 Energy Conservation with Dissipative Forces: Solving Problems 6.10 Power		
7+8 **1 weeks**	**Ch7: Linear Momentum** 7-8 Center of Mass (CM) 7-9 CM for the Human Body **Ch8: Rotational Motion** 8.4 Torque	**Ch7:** **46, 51, 52, 53** **Ch8:** **24, 25, 27**	
9 **1.5 weeks**	**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	**4, 5, 16, 17, 18, 32, 38, 39, 43, 46, 50**	
10 **2.0 weeks**	**Fluids** 10.1 Phases of Matter 10.2 Density and Specific Gravity 10.3 Pressure in Fluids 10.4 Atmospheric Pressure and Gauge Pressure	**5, 10, 11, 18, 20, 26, 27, 38, 48, 54, 56, 60, 88**	

	10.5 Pascal's Principle 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		
23 **2.0 weeks**	**LIGHT: GEOMETRIC OPTICS** 23-1: The Ray Model of Light 23-4: Index of Refraction 23-5: Refraction: Snell's Law 23-6: Total Internal Reflection; Fiber Optics 23-7: Thin Lenses; Ray Tracing 23-8: The Thin Lens Equation	**25, 26, 28, 31, 34, 36, 40, 42, 45, 48, 50, 53, 78, 79**	
30 **1 week**	**Nuclear Physics and Radioactivity** 30-1 Structure and Properties of Nucleus 30-3 Radioactivity 30-6 Gamma Decay 30-8 Half-Life and Rate of Decay 30-9 Calculations Involving Decay Rates and Half-Life	**2, 37, 43, 42, 46, 49**	

31 **1 week**	**Nuclear Energy; Effects and Uses of Radiation** 31.4 Passage of Radiation Through Matter; Biological Damage 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)	**38, 40, 41, 44, 46**

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
First Midterm	30%	Kinematics and dynamics, vectors, energy and momentum	SLOs 1,2,3,4	9th week	Computerized
Second Midterm	20%	Fluids and statistics and torque	5,6	12th week	Computerized
Final Exam	50%	All Material	1-8	During Final exam period	Computerized

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23 Course Requirements

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

24 Course Policies:

A- Attendance policies: **No more than 15% of classes can be missed under any circumstances. The students are supposed to be on time for each session and will not be admitted after 10 minutes from the starting time.** B- Absences from exams and handing in assignments on time: **Assignments are only taken if submitted on time and no make ups for short quizzes.** C- Health and safety procedures: **The lectures are located in proper locations for best lecturing conditions.** D- Honesty policy regarding cheating, plagiarism, misbehavior: **Any act of cheating or plagiarism is not tolerated and the students are clearly required to submit their own work.** E- Grading policy: **The grading for this course is divided into: 50 % exams, homework, discussions, 50% final exam.** F- Available university services that support achievement in the course: **A proper library and very well furnished lab.**

25 References:

A- Required book(s), assigned reading and audio-visuals: **Textbook:** "Physics" Douglas C. Giancoli, "**Physics**", **Seventh** Edition, Pearson, 2015 B- Recommended books, materials, and media:

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Recommended References:

1. Joseph W. Kane and Morton M. Sternheim, "**Physics**", 3rd Edition, (John Wiley & Sons, 1988).

2. Raymond A. Serway and John W. Jewett Jr., "**Physics For Scientists and Engineers with Modern Physics**" 7th Edition, (Thomson Learning, Belmont, CA, USA, 2007).

26 Additional information:

Name of Course Coordinator: Riad Shaltaf Signature: ---------- Date: Nov 1, 2022 Head of Curriculum Committee/Department: ---------- Signature: ---------- Head of Department: ---------- Signature: ---------- Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------