The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name: General Physics 1

First Semester 2016/2017

1	Course title	*General Physics 1*
2	Course number	*0302101*
3	Credit hours (theory, practical)	*3 (theory)*
	Contact hours (theory, practical)	*3 (theory)*
4	Prerequisites/corequisites	*None*
5	Program title	*Bachelor in Physics*
6	Program code	*0302*
7	Awarding institution	*The University of Jordan*
8	Faculty	*Faculty of Science*
9	Department	*Physics*
10	Level of course	*First year/ Bachelor*
11	Year of study and semester (s)	*2016/2017; First Semester*
12	Final Qualification	*Bachelor*
13	Other department (s) involved in teaching the course	*None*
14	Language of Instruction	*English/ Arabic*
15	Date of production/revision	*January 12, 2017*

16. Course Coordinator:

Moneeb T. M. Shatnawi, Ph. D. *Room 200, Physics Building,* *Faculty of Science,* *The University of Jordan* *E-mail: moneeb.shatnawi@ju.edu.jo* *Phone: ++962-6-5355000 Ext. 22064; 22023* *Mobile: 0775509916*	*Office Hours:* *Sunday: 12-1 & 3-4* *Monday: 12-12:30* *Tuesday: 12-1 & 3-4* *Wednesday: 12-12:30* *Thursday: 12-1 & 3-4*

17. Other instructors:

Prof. Dr. Humam B. Ghassib, Prof. Dr. Laila Abu-Hassan, Prof. Dr. Ma'arouf Haj Abdallah, Prof. Dr. Mosa Abd Algader, Prof. Dr. Noor AlDeen Shoaer, Dr. Hassan Al-Jawhary, Dr. Bashar Lahloh, Dr. Khalid Al-Bodoor, Dr. Hanan Sa'adeh, Dr. Mohammad Hosain, Dr. Ala'a Al- Azzam, and Dr. Moneeb Al-Shatnawi.

18. Course Description:

This course forms an introductory subject in mechanics. It includes the following topics:

- Physical units and physical quantities.
- Introduction to vectors.
- Motion along a straight line.
- Motion in two or three dimensions.
- Newton's laws of motion.
- Applying Newton's laws.
- Work and kinetic energy
- Potential energy and energy conservation
- Momentum, impulse and collisions.
- Rotation of rigid bodies.
- Dynamics of rotational motion.
- Equilibrium and elasticity.
- Universal Gravitation.

19. Course Aims and Outcomes:

A- Aims:
1. Understanding the fundamental concepts and techniques of classical mechanics.
2. Learning how to invoke these concepts qualitatively as well as quantitatively.
3. Developing critical and analytical thinking as well as problem-solving skills.
4. Gaining an appreciation of the role of physics in our daily lives.

B- Intended Learning Outcomes (ILOs):
Upon the successful completion of this course, students will be able to:

1. Use vectors in calculations.
2. Describe one- and two-dimensional motions, using appropriate kinematic equations.
3. Understand Newton's three Laws of Motion and related applications, with special emphasis on the free-body diagram.
4. Delineate the relationship between work, energy, and power.
5. Understand the basic conservation laws (of energy and momentum).
6. Solve elementary problems encountered in everyday life.
7. Demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
8. Demonstrate the ability to think critically and to use appropriate concepts to analyze qualitatively problems or situations involving the fundamental principles of physics.

20. Topic Outline and Schedule:

Chapter	Content	Suggested Problems	Tentative number of Hours
1	**Units, Physical Quantities and Vectors** 1.7: Vectors and Vector Addition 1.8: Components of Vectors 1.9: Unit Vectors 1.10: Product of Vectors	**26, 29, 33, 36, 42, 43, 60, 81**	**2 h**
2	**Motion Along a Straight Line** 2.1: Displacement, Time and Average Velocity 2.2: Instantaneous Velocity 2.3: Average and Instantaneous Acceleration 2.4: Motion With Constant Acceleration 2.5: Freely Falling Bodies 2.6: Velocity and Position by Integration	**1, 4, 8, 14, 19, 31, 35, 42, 49, 53, 70**	**3 h**
3	**Motion in Two or Three Dimensions** 3.1: Position and Velocity Vectors 3.2: The Acceleration Vector 3.3: Projectile Motion 3.4: Motion in a Circle	**1, 5, 8, 10, 16, 26, 28, 41, 57**	**3 h + Review 1 h**
4	**Newton's Laws of Motion** 4.1: Force and Interaction 4.2: Newton's First Law 4.3: Newton's Second Law 4.4: Mass and Weight 4.5: Newton's Third Law 4.6: Free-Body Diagrams	**2, 7, 16, 23, 28, 31, 40, 49**	**2 h**
13	**Gravitation** 13.1: Newton's Law of Gravitation 13.2: Weight	**4, 5, 11, 12**	**2 h**
5	**Applying Newton's Laws** 5.1: Using Newton's First Law: Particles in Equilibrium 5.2: Using Newton's Second Law: Dynamics of Particles 5.3: Frictional Forces 5.4: Dynamics of Circular Motion 5.5: The Fundamental Forces of Nature	**1, 7, 9, 15, 20, 27, 37, 45, 50, 65, 74**	**3 h + Review 1 h**
6	**Work and Kinetic Energy** 6.1: Work 6.2: Kinetic Energy and the Work-Energy Theorem 6.3: Work and Energy with Varying Force 6.4: Power	**1, 8, 16, 20, 24, 36, 50, 51, 62, 71, 79**	**2 h**
7	**Potential Energy and Energy Conservation** 7.1: Gravitational Potential Energy	**1, 9, 21, 27, 30, 33, 41, 55**	**3 h + Review 1 h**

	7.2: Elastic Potential Energy 7.3: Conservative and Non-Conservative Forces 7.4: Force and Potential Energy		
8	**Momentum, Impulse and Collisions** 8.1: Momentum and Impulse 8.2: Conservation of Momentum 8.3: Momentum Conservation and Collisions 8.4: Elastic Collisions 8.5: Center of Mass (No Integrals)	**3, 7, 13, 18, 31, 33, 44, 48, 51, 55, 73**	**3 h + Review 1 h**
9	**Rotation of Rigid Bodies** 9.1: Angular Velocity and Angular Acceleration 9.2: Rotation with Constant Angular Acceleration 9.3: Relating Linear and Angular Kinematics 9.4: Energy in Rotational Motion 9.5: Parallel-Axis Theorem	**2, 8, 9, 11, 23, 28, 36, 43**	**4 h**
10	**Dynamics of Rotational Motion** 10.1: Torque 10.2: Torque and Angular Acceleration for a Rigid Body 10.3: Work and Power in Rotational Motion 10.5: Angular Momentum 10.6: Conservation of Angular Momentum	**1, 4, 5, 9, 16, 30, 31, 35, 36, 40, 43**	**4 h + Review 1 h**
11	**Equilibrium and Elasticity** 11.1: Conditions for Equilibrium 11.2: Center of Gravity 11.3: Solving Rigid-Body Equilibrium Problems	**1, 3, 18, 14, 17**	**3 h + Review 1 h**

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Lecturing
- Solving Numerous Problems
- Class Demonstrations whenever possible.

22. Evaluation Methods and Course Requirements:

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

Three Written Exams:

- **First Exam 20%**
- **Second Exam 30%**
- **Final Exam 50%**

Occasionally class discussions.

23. Course Policies:

A- Attendance policies:

Attending classes is required. Absences with legal excuses are accepted.

B- Absences from exams and handing in assignments on time:

Attending the exact date of all exams is required. Absences with legal excuses –approved by university regulations- are accepted. Students should take the relevant make up exam.

C- Health and safety procedures:

No health hazards are expected through this course.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Cheating, plagiarism, or any misbehavior conducted by the student is subject to university regulations.

E- Grading policy:

There are three written exams with the following weights:

First Exam: 20%

Second Exam: 30%

Final Exam: 50%

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

Students can get the required textbook from the university book store located at the university campus. All the suggested references are included in the university main library located also at the university campus. Students can access the e-learning portal and print necessary materials through the computer labs that are distributed at many locations through the university campus.

24. Required equipment:

We expect the presence of a white board & Markers, data show as well as an overhead projector in the lecture hall. No other equipment is needed for teaching this course.

25. References:

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

Textbook Title: University Physics with Modern Physics
Authors: F. Sears and M. Zemansky
Edition: Fourteenth
Publisher: Pearson Education Limited

B- Recommended books, materials, and media:

- *Physics For Scientists and Engineers with Modern Physics* by Raymond A. Serway and John W. Jewett Jr., 9th edition (Thomson Learning, Belmont, CA, USA, 2014).
- David Halliday, Robert Resnick and Jearl Walker, *Extended Principles of Physics*, 9th edition (Wiley, 2011).
- Bauer Westfall, *University Physics with Modern Physics* (McGraw Hill, 2011).
- James S. Walker, *Physics*, 4th Edition, (Addison–Wesley, 2010).
- Giancoli, *Physics for Scientists & Engineers with Modern Physics*, 4th edition, (Pearson Education, 2009).
- Ohanian and Market, *Physics for Engineers and Scientists*, extended 3rd edition (Norton, 2007).

26. Additional information:

Name of Course Coordinator: **Dr. Moneeb T. M. Shatnawi** Signature: ----------

Date: **January, 12, 2017.**

- Head of curriculum committee/Department: Signature: ----------

- Head of Department: Signature: ----------

Head of curriculum committee/Faculty: Signature: ----------

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

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File