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|  | **Mutah University**  **Departmentof Physics**  **General Physics 101** | Description: C:\Users\lamasat.lamasat-PC\Pictures\Picture1.png |

**Course Information:**

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| Course Number:0302101 | Course Title:General Physics (1) |
| Credit Hours:3 hours | College:Science |
| Pre-requisite: non | Department: Physics |
| Instructor:  Dr. Moaz Altarawneh | Semester&AcademicYear:  Spring 2017/2018 |
| The time of the lecture: | Office Hours:Sun, Tues, Thursday : 11-12 Mon, Wed: 8-11 |

**General CourseDescription**

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| This course is an introductory course in Newtonian mechanics with topics include: kinematics in one and two dimensions, dynamics (Newton's laws of motion), Newton's laws in circular motion, work and energy, collisions, rotational motion and equilibrium of rigid bodies. |

**Course Objectives**

* To build up an understanding of fundamental physical principles.
* To build up a basic understanding of when and where specific physical principles apply.
* To build up an understanding of how physical principles are applied in everyday life and engineering;
* To build up basic skills necessary for solving problems with practical applications by using physical principles;
* To equip students with the basic skills necessary for understanding of physical principles in terms of multiple representations: graphs, diagrams, equations.
* To familiarize students with the basic data analysis skills.

**Expected Learning Outcomes**

* Use kinematics equations to describe non-accelerated and accelerated motions of an object like a particle.
* Apply Newton's laws of motion to solve linear dynamics problems.
* Use the work-energy approach to solve dynamics problems involving conservative and non-conservative forces.
* Apply momentum-impulse approach solve problems involving changing motions in due to elastic and inelastic collisions.
* Apply rotational analogs of Newton's laws of motion to solve dynamics problems involving rotational motion.
* Apply basic understanding of statics to simple particles and structures.

**CoursePlanDistribution& Learning Resources**

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| **CHAPTERS** | | | | | | | | **SECTIONS** | **week**s |
| **Ch.1** | | **Physics and**  **Measurement**  **(2- Lecture)** | | | | | | 1.1 Standard of length, mass, and time.  1.4 Dimensional analysis.  1.5 Conversion of units. | **1** |
| **Ch.2** | **Motion in One Dimension**  **(4-Lectures)** | | | | | | | 2.1 Position, velocity and speed.  2.2 Instantaneous velocity and speed.  2.3 Acceleration.  2.4 Motion diagrams.  2.5 One-dimensional motion with constant acceleration.  2.6 Freely falling objects. | 2, 3 |
| **Ch.3** | **Vectors**  **(4-Lectures)** | | | | | | | 3.1 Coordinate systems.  3.2 Vector and scalar quantities.  3.3 Some properties of vectors.  3.4 Components of a vector and a unit vectors.  --- Dot product and Cross product | 3 |
| **Ch.4** | **Motion in Two Dimensions**  **(3-Lectures)** | | | | | | | 4.1 The Displacement, velocity and acceleration vectors.  4.2 Two-dimensional motion with constant acceleration.  4.3 Projectile motion.  4.4 Uniform circular motion.  4.5 Tangential and radial acceleration. | 4,5 |
| **First exam** | | | | | | | | | |
| **Ch.5** | | | | **The Laws of Motion**  **(5-Lectures)** | | | | 5.1 The concepts of force.  5.2 Newton’s first law and inertial frames.  5.3 Mass.  5.4 Newton’s second law.  5.5 The gravitational force and weight.  5.6 Newton’s third law.  5.7 Some applications of Newton’s laws.  5.8 Forces of friction. | 5,6 |
| **Ch.6** | | | **Circular Motion**  **(2 Lectures)** | | | | | 28.1 Newton’s second law applied to uniform circular motion.  28.2 Non uniform circular motion. | **6,7** |
| **Ch.7** | | | **Energy and Energy Transfer**  **(5-Lectures)** | | | | | 7.2 Work done by a constant force.  7.3 The scalar product of two vectors.  7.4 Work done by a varying force.  7.5 Kinetic energy and the work-kinetic energy theorem.  7.6 The non-isolated system – Conservation of energy.  7.7 Situations involving kinetic friction.  7.8 Power. | **7, 8** |
| **Ch.8** | | | **Potential energy**  **(5-Lectures)** | | | | | 8.1 Potential energy of a system.  8.2 The isolated system – conservation of mechanical energy.  8.3 Conservative and non-conservative forces.  8.4 Changes in mechanical energy for non-conservative.  8.5 Relationship between conservative forces and potential energy. | 8,9 |
| Second exam | | | | | | | | | |
| **Ch.9** | | | | | **Linear momentum and collisions**  **(5-Lectures)** | 9.1 Linear momentum and its conservation.  9.2 Impulse and momentum.  9.3 Collisions in one dimension.  9.4 Two-dimensional collisions.  9.5 The center of mass. | | | **10,11** |
| **Ch.10** | | | | | **Rotation of a rigid object about a fixed axis**  **(5-Lectures)** | 10.1 Angular position, velocity and acceleration.  10.2 Rotational kinematics: rotational motion with constant angular acceleration.  10.3 Angular and linear quantities.  10.4 Rotational kinetic energy.  10.5 Calculation of moments of inertia.  10.6 Torque.  10.7 Relationship between torque and angularacceleration. | | | **11,12** |
| **Ch.11** | | | | | **Angular Momentum**  (3-Lectures) | | 11.1 The Vector Product and Torque.  11.2 Angular Momentum.  11.3 Angular Momentum of a Rotating Rigid Object.  11.4 Conservation of Angular Momentum.  11.5 The Motion of Gyroscopes and Tops.  11.6 Angular Momentum as a Fundamental Quantity | | **13,14** |
| **Ch12** | | | | | **Static Equilibrium andElasticity**  **3- lectures** | | 12.1 The Conditions for Equilibrium.  12.2 More on the Center of Gravity.  12.3 Examples of Rigid Objects in Static  Equilibrium.  12.4 Elastic Properties of Solid. | | **15** |

**Teaching Strategies and Methods**

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| **Teaching Strategies and Methods** | No |
| Normal lecturing methods using white board | **1** |
| Demonstrations drawn in the white board | **2** |

**Methodsof Assessment**

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| **Proportion of Final Evaluation** | **Evaluation Methods of** | **Week & Date** | **No.** |
| **25%** | First Exam |  | **1.** |
| **25%** | Second Exam |  | **2.** |
| **50%** | Final Exam |  | **3.** |
| **(100%)** |  | **Total** | |

**Required Textbooks**

**- Primary Textbook:**

***Physics for Scientists & Engineers with Modern Physics***

**Raymond A. Serway and John W. Jewett, 6th Ed., 2004.**

**-Secondary References**

* D. Halliday, R. Resnick, J. Walker / ***Fundamentals of Physics*** / John Wiley & Sons, 5th Ed., 1991.
* F. W. Sears, M. W. Zemansky, H. D. Young / ***University Physics***/ Addison-Wesley Publishing Company; 7th Ed., 1987.

Notes:

* Attendance is very important and university regulations regarding attendance will be followed strictly.
* To achieve high score in this class it is recommended to solve as much problems as possible.