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

**Course Information:**

|  |  |
| --- | --- |
| 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**

|  |
| --- |
| 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**

|  |  |  |
| --- | --- | --- |
| **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**

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

**Methodsof Assessment**

|  |  |  |  |
| --- | --- | --- | --- |
| **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.