

Beijing Jiaotong University

2019 Summer Session

PHY 101 Introduction to Physics with Lab

Course Outline

Term: July 08-August 09,2019

Class Hours: 16:00-18:00 (Monday through Friday)

Course Code: PHY 101

Instructor: Jordan Morelli, Ph.D., P.Eng.

Home Institution: Queen's University at Kingston

Office Hours: TBA

Email: morelli@queensu.ca

Credit: 4

Class Hours: This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10 laboratory hours.

Course Description:

This course provides an introduction to physics through the exploration of classical mechanics. Topics include: linear and angular kinematics, kinetics, forces, linear momentum, work and energy, torques, angular momentum, and the conservation laws.

Required Textbooks:

“University Physics with Modern Physics” by Young and Freedman, 14th Ed.

Grading & Evaluation:

Homework Assignments: 20%

In-Class Quizzes: 14%

Labs: 16%

Midterm Exam: 20%

Final Exam: 30%

Attendance: Attendance at every class session is mandatory.

There will be one homework assignment due at the start of every class, except on the days with the midterm examination and the final examination. Each assignment will take you about ninety minutes to complete. Your two lowest homework marks will be dropped in calculating your final grade.

Each lecture class will include a number of short quizzes throughout the period.

Each student is required to have a bound laboratory notebook for use in the laboratory. Each laboratory period will include a number of short questions that must be answered in your laboratory notebook for grading at the beginning of the next class session.

Course work throughout the term will be assessed using percentage grades, but the final course grade will be converted to a letter grade according to the following scale: A (94%-100%), A- (90%-93%), B+ (87%-89%), B (84%-86%), B- (80%-83%), C+ (77%-79%), D (60%-69%), and F (59% and below). Note: most colleges and universities do not award transfer credit for grades of D or F.

Course Schedule:

Week 1:

Lecture 1: Course Introduction, Introduction to Kinematics, Review of Vectors

Lecture 2: Projectile Motion

Lecture 3: Uniform Circular Motion

Lab 1: Introduction to error analysis and measurement uncertainty

Week 2:

Lecture 4: Rotational Variables and Equations of Motion

Lecture 5: Relative Motion

Lecture 6: Forces and Newton's Laws, Examples involving Friction and Circular Motion

Lab 2: Determination of the local acceleration due to gravity

Week 3:

Lecture 7: Work and Kinetic Energy, Examples involving Work by Springs and Gravity

Lecture 8: Potential Energy, Conservation of Energy, and Power

Lecture 9: Centre of Mass, and Linear Momentum

Midterm Examination

Week 4:

Lecture 10: Conservation of Linear Momentum, Examples involving collision and explosions

Lecture 11: Rolling Motion (with and without slipping)

Lecture 12: Rotational Kinetic Energy, and Moments of Inertia

Lab 3: Projectile Motion

Week 5:

Lecture 13: Torque, Work and Power by External Torques, and Angular Momentum

Lecture 14: Static Equilibrium

Lab 4: Centre of Mass

Final Examination