PHY 115 – Spring 2014

Study Guide for the Final Exam

- The table below is a guide to the topics and concepts you will need for the PHY 115 Final Exam.
- The Final will be on Wednesday, April 23, at 3:00 pm.
- Please bring a calculator. You may bring a note sheet. The usual rules apply.
- The main recommendations are: redo all homework, midterm and quiz problems that are related to the topics below. You should also read the textbook and the class notes. All the homework solutions are available on Moodle.
- Use the PhET URLs (available on Moodle) for energy and momentum simulations.

The table below lists the topics, chapter/sections from the textbook and assignments that are relevant for the final exam. The table continues on the next page.

Topic	Relevant Concepts	Chapters/Sections	Related to Assignment #
Kinematics: 1-D motion	Basic units and unit conversions Constant-speed motion Position and displacement Average and instantaneous: speed, velocity, acceleration Graphing constant-speed and accelerated motion	Chapter 2: sections 2.1 through 2.3	2, 3
Kinematics, 1-D motion: the Kinematic Equations	Uniformly accelerated motion: the Kinematic Equations Using graphs and kinematic equations to solve problems	Chapter 2: sections 2.4, 2.5	3
Free-fall: a particular case of uniformly accelerated motion	Applying the Kinematic equations to free-fall problems Graphing free-fall motion	Chapter 2: section 2.6	3
Vector addition and vector components	Using a coordinate system and splitting vectors into x and y components.	Chapter 1: sections 1.7 and 1.8	4

Motion in a plane and projectile motion	Graphing and solving problems involving 2-D motion (including projectile motion problems) Sets of equations used for projectile motion: uniform motion in the horizontal direction and accelerated motion in the vertical direction.	Chapter 3, sections 3.1 to 3.3	4
Newton's Laws of Motion	Types of Forces, part 1 (normal, gravitational, tension) Free-body diagrams Newton's First, Second and Third Law	Chapter 4, all sections	5 and 6
Applications of Newton's Laws	Types of forces, part 2 (static and kinetic friction) 1D and 2D motion with free-body diagrams Using Newton's Laws to solve force and motion problems Elastic Forces	Chapter 5, all sections	5, 6 and 8
Circular motion	Centripetal acceleration and centripetal force (a net force)	Chapter 6, sections 6.1 and 6.2	5 and 8
Work and energy	Kinetic energy Potential energies (gravitational and elastic) Conservation of energy Conversion of potential energy (gravitational or elastic) into kinetic energy and vice-versa Definition and calculation of work Meaning of negative and positive works Conservative and nonconservative forces (e.g., the drag force and the friction force)	Chapter 7: sections 7.1 to 7.7	7 and 8
Momentum	Definition and calculation of momentum Conservation of momentum in collisions and explosions Change in momentum (impulse) Completely elastic collisions in 1D (objects bounce): kinetic energy and momentum are conserved Completely inelastic collisions (objects stick together): momentum is conserved, but kinetic energy is not conserved. Special case of inelastic collision: the ballistic pendulum	Chapter 8, sections 8.1 to 8.4	9

<u>Office hours:</u>

Monday, 4:30 p – 5:30 p. I can also be available at other times, but in this case you should schedule your appointment by email. Please refer to the Academic support Center schedule for the tutor's hours.