John Jay College of Criminal Justice
The City University of New York
524 West 59th St., New York NY 10019

PHYSICS 101-01

Professor: Diane Crenshaw
Contact: dcrenshaw@jjay.cuny.edu, office 3.77 E
Office hour: Tues 7:30-8am and 1:30-2pm, or by appt.
Semester and Course Code: Spring 2013, PHY101
Lecture: T 8:00-10:40 rm 3.65, Section 01
Lab: R 8:00-10:40 rm 3.65, Section 01
Co-requisite: Math 105

Required Text:
Knight, R., Jones, B., & Field, S. (2009). College physics: A strategic approach, 2nd edition, Volume 1 (Chapters 1-16). Addison Wesley. ISBN: 0321598520

→ This book can be ordered online.
→ If you think you might take Phy102, consider purchasing the whole book (not just vol. 1)

Course Description: Phy101 is an algebra-based introductory physics course. Concepts from Phy101 include motion, forces, energy, and momentum. Knowledge will be constructed through experimentation and practices of science. Knowledge will then be applied to understand real-world phenomena, current issues (local and global), and topics of interest. Phy101 requires active learning, engagement, and full participation.

Learning Outcomes: As a result of active participation in the course, students will develop the following knowledge, reasoning ability, practical skills, and communication skills.

- **KNOWLEDGE: Develop knowledge of physics concepts including motion, forces, energy, and momentum.** These are the fundamental concepts in mechanics and provide the basis for understanding our physical world and for future study in physics.
- **KNOWLEDGE: Develop a rich understanding of the nature and epistemology of science.** Students will learn how science knowledge is constructed and will participate in constructing knowledge as well. This will help students to understand the applications and limitations of science knowledge and research.
- **KNOWLEDGE: Develop an understanding of the relation of science, technology, and society, in particular, how physics applies to real-world phenomena, current issues (local and global), and topics of interest.** This will allow students to apply physics in their everyday lives as scientists and informed individuals.
- **REASONING: Develop metacognition and self-efficacy in science.** Students will build problem-solving and thinking skills, as well as confidence in their abilities as scientists. Physics requires much problem solving, mathematical and conceptual, doing calculations and in the lab. Through practice, these skills will become more expert-like.
- **PRACTICAL SKILLS: Develop skills and abilities related to the practices of science.** Students will be able to design, perform, and evaluate experimental studies. They may apply this method to test ideas or solve problems in their everyday lives.
- **COMMUNICATION: Develop collaborative skills and skills in scientific discourse.** Students will often work in collaboration and will do presentations and submit written reports. They will learn the language of science (written and oral) as well as newer technology-enhanced communication methods (email, google docs, blogs, etc.)

Course Policies:

1) Attendance: PROMPTNESS AND ATTENDANCE ARE ESSENTIAL FOR THIS COURSE. You are required to attend all lecture and lab sessions, and to be on time. The instructor will take attendance at the beginning of class (8am). Two tardies (arrival shortly after class begins) count as one absence. More than four (4) absences are considered excessive and ***you will receive a grade of F***. Work missed due to absence/tardy will not be accepted.

2) Blackboard and Email: Course grades, assignments, and resources will be posted on Blackboard. You are responsible for any and all course information, assignments, announcements, and communication that occur through blackboard and/or your email account. For this reason, you must check blackboard and your John Jay e-mail account regularly. Also, many assignments will be submitted and feedback will be given through email. It is your responsibility to submit assignments via email by assignment due dates. Contact DoIT for help with John Jay e-mail or Blackboard.

3) Physics Notebook: In addition to the course textbook, you will record and organize your knowledge and application in a 3-ring binder. You will 3-hole punch all notes, documents, and worksheets and organize them by unit in your binder. This will be your self-created text that you will reference as you learn.

4) Required Materials: 3-ring binder, loose-leaf paper, calculator, textbook
*Cell phone calculator may be used during class but NOT during exams.

Grading:

Midterm Exam	**20%**
Final Exam	**20%**
Lab Work	**20%**
Homework	**20%**
Book Club	**10%**
Blog	**10%**
Total	**100%**

Midterm and Final Exams: The midterm and final exams are cumulative and therefore assess course content from the beginning of the course through the exam date. Exams are based on in class work (including labs and class activities) and homework (including the textbook). At least 1-week notice will be given prior to exam dates. Make-up exams will not be given.

Lab Work: Labs are conducted on Tuesdays and lab write-ups are due via email the following Tuesday before 8am – no exceptions. These will be done in groups and each group member will receive the same grade. Each group member should be "first author" on a lab write-up, which means he or she is the group manager and divides work among group members to assure the lab is completed on time and high quality. Since there are 13 labs in total, you will be first author on at least 4 labs**.** Other group members may take on roles such as equipment manager, recorder, and skeptic in addition to working on the lab write-up. **Students absent on the day a lab was conducted will not receive credit for the lab write-up and should not be listed as an author.**

Homework: Homework is assigned on Thursdays and is due the following Thursday at 8am. Each homework assignment includes textbook reading and a problem set. Homework is graded based on thoroughness, thoughtfulness, clarity, and consistency with physics concepts studied thus far.

Book Club: Three times during the semester we will start class with "book club." Prior to book club you will be assigned reading relevant to science, society, and current events. Each student should do the readings and a group of students is responsible for leading the discussion. You will be a discussion leader once during the semester with a group of your classmates. As a discussion leader, your group should prepare interesting questions and engage your classmates in a rich discussion around science and society. You may tailor your questions to make them interesting, relevant, and engaging. You may also use multimedia if desired.

Blog: We will create a class blog where you can post pictures, videos, thoughts, articles, links, etc. related to your study of physics. Your postings should demonstrate how you see physics in your world -- there is no right or wrong thing to post about. If you post multimedia, please include a short paragraph explaining your thoughts about the posting. You can post as often as you like -- you must post at least 3 times before the midterm and 3 times after the midterm for a 100%. Your class blog website is http://jjphysics01.blogspot.com/ and you can post by sending an email to miss.diane.crenshaw.phy01@blogger.com. You may also comment on your classmates' posts using a gmail account. Please sign your name to your postings and comments to received credit.

Overall Grade: The grading scale to the right is the official grading scale for this course. There will be no exceptions to this scale and grades will not be rounded, except as explained here. The "overall" grade in Blackboard will be rounded to the nearest tenth of a point. This is the final grade and no further manipulations will be made. The scale here will then be strictly used. This means that a 72.94% is a "C-" and a 72.95% is a "C." These calculations are done by the computer so there are no judgment calls or "leniency." You should track your overall grade online via Blackboard.

93.0 and above	A
90.0 - 92.9	A-
87.0 - 89.9	B+
83.0 - 86.9	B
80.0 - 82.9	B-
77.0 - 79.9	C+
73.0 - 76.9	C
70.0 - 72.9	C-
67.0 - 69.9	D+
63.0 - 66.9	D
60.0 - 62.9	D-
below 60.0	F

Additional Resources: The Math and Science Resource Center offers free tutoring if you want extra help with physics or if you want to brush up on your math skills. They are located in the New Building rm 01.94. Phone: 646.557.4635, email: msrc@jjay.cuny.edu, website: www.jjay.cuny.edu/academics/592.php

College Wide Policies:

1) Incomplete Grade Policy: An Incomplete Grade may be given only to those students who would pass the course if they were to satisfactorily complete course requirements. It is within the discretion of the faculty member as to whether or not to give the grade of Incomplete.

2) Extra Work During the Semester: Any extra credit coursework opportunities during the semester for a student to improve his or her grade must be made available to all students at the same time. Furthermore, there is no obligation on the part of any instructor to offer extra credit work in any course. The term "extra credit work" refers to optional work that may be assigned by the instructor to all students in addition to the required work for the course that all students must complete. It is distinguished from substitute assignments or substitute work that may be assigned by the instructor to individual students, such as make-up assignments to accommodate emergencies or to accommodate the special circumstances of individual students.

3) Accommodations for Students with Disabilities: Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the OAS which is located at L66 in the new building (212-237-8031). It is the student's responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor.

Statement of the College Policy on Plagiarism:
Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation.

Physics 101-01 Calendar		
Date	**Topic**	**Labs, Lessons, and Homework**
1/29 Tues	Unit 1: Constant Velocity	**#1** **Lab 1:** Constant Velocity -- represent the motion of a buggy moving at constant velocity; create visual, graphical, and mathematical models for any object moving at a constant velocity ***All labs due 1 week from date of experiment. So, this lab is due Tues 2/5.**
1/31 Thurs		**#2** **Concepts:** position, displacement, velocity (and scalar, vector, frame of reference) **Representations:** position vs. time graphs, velocity vs. time graphs, constant velocity equations, motion maps, pictures **Hmwk 1**: Chapter 1: Read pgs. 1-24. Do Q (pg. 25) #2, 6, 9, 10, 18 and P (pg. 26) #4, 8 ***All hmwks due 1 week from date listed. So, this hmwk is due Thurs 2/7.**
2/5 Tues	Unit 2: Acceleration	**#3** **Lab 2:** Constant Acceleration – represent the motion of a marble rolling down a ramp; create visual, graphical, and mathematical models for any object moving at a constant acceleration.
2/7 Thurs		**#4** **Concepts:** instantaneous velocity, acceleration **Representations:** position vs. time graphs, velocity vs. time graphs, acceleration vs. time graphs, kinematic equations, motion maps, pictures **Hmwk 2:** Chapter 2: Read pgs. 30-51. Do Q (pg. 59) #4, 11, 23 and P (pg. 61) #5, 7, 19
2/12 Tues	*no class – presidents day	
2/14 Thurs	*classes follow Tuesday schedule	**#5** **Lab 3:** Physics in the City – analyze the motion of an object using video analysis; represent the motion of the object visually, graphically, and mathematically. (*This lab requires you to film a video of a moving object outside of the physics classroom. Bring this video to class on 2/14. This lab write-up will be due on 2/21 Thurs. All labs due on Tuesdays except this one.)
2/19 Tues		**#6** **Lab 4:** Motion Detectors – predict graphical representations of a cart on a ramp; verify predictions with motion detectors; reconcile discrepancies between predictions and motion detector graphs. ***theory write-up**
2/21 Thurs		**#7** **Book Club #1!**

		Apply findings to solve problems with graphs, mathematics, and visual representations; present problem solving **Hmwk 3:** Chapter 2: Read pgs. 30-51. Do Q (pg. 60) #15, 20 and P (pg. 62) #21, 26, 36
2/26 Tues	Unit 3: Free Fall	**#8** **Lab 5:** Acceleration due to Gravity -- represent the motion of a falling object visually, graphically, and mathematically; determine what factors do and do not affect the rate at which an object falls.
2/28 Thurs		**#9** **Apply findings** to solve problems with graphs, mathematics, and visual representations; present problem solving **Hmwk 4:** Chapter 2: Read pgs. 52-58. Do Q (pg. 59) #2, 7, 22 and P (pg. 63) #40, 43
3/5 Tues	Unit 4: 2-D Motion	**#10** **Lab 6:** Projectile Motion -- represent the motion of a 2-dimensional projectile by i) dividing the motion into x and y components and ii) applying the constant velocity model and constant acceleration model; create visual, graphical, and mathematical models for any object moving in a projectile.
3/7 Thurs		**#11** **Concepts:** independence of x and y directions **Representations:** x and y position vs. time graphs, velocity vs. time graphs, acceleration vs. time graphs **Hmwk 5:** Chapter 3: Read pgs. 82-88. Do Q (pg. 95) #5, 8, 21 and P (pg. 97) #21, 27
3/12 Tues	Review	**#12** **Review:** Bring together ideas from previous units to solve problems involving motion.
3/14 Thurs	Midterm	**#13** *midterm
3/19 Tues	Unit 5: Newton's Laws	**#14** **Lab 7:** Force Lab Stations – (1) Frictionless track: relate force to motion, including velocity and acceleration. (2) Force of Earth (Gravitational Force): determine an equation relating the mass of an object and how hard Earth pulls on that object. (3) Normal force: Determine if a table applies a force to an object sitting on it. (4) Forces with Phet: Qualitatively determine how forces affect the velocity and acceleration of an object. Compare and contrast for surfaces with and without friction. ***theory write-up**
3/21 Thurs		**#15** **Book Club #2!**

		Concepts: force, net force, equilibrium, mass, inertia, Newton's 1st law, gravitational force (weight), normal force, friction, tension **Representations:** Force diagrams **Hmwk 6: TBD**
3/26 3/28 4/2	**Spring Break!**	
4/4 Thurs		**#16** **Activity:** Reconciling Common Sense with Newton's 1st and 2nd Laws – explain Newton's 1st and 2nd Laws; apply your understanding to explain the case of pulling a child out of a well (explain the forces acting on the child i) just when he begins to move and ii) as he is raised at a constant velocity). **Concepts:** Newton's 2nd Law **Apply findings** to solve problems involving forces **Hmwk 7: TBD**
4/9 Tues		**#17** **Lab 8:** Counterintuitive ideas: Newton's 3rd Law -- explain Newton's 3rd Law; apply your understanding to explain the case of a heavy truck crashing into a parked car (explain how Newton's 3rd law makes sense in this situation). ***theory write-up**
4/11 Thurs		**#18** **Concepts:** Newton's 3rd Law **Apply findings** to solve problems involving forces **Hmwk 8: TBD**
4/16 Tues	Unit 6: Energy	**#19** **Lab 9:** Force and Elastic Energy of a Spring -- determine the relationship between the force applied to a spring and how far the spring stretches; determine the relationship between how far the spring is stretched and the elastic potential energy stored in the stretched spring.
4/18 Thurs		**#20** **Concepts:** Conservation of energy, modes of energy storage (kinetic, gravitational, elastic, internal, and chemical), work **Representations:** Energy pie**,** energy bar graph **Apply findings** to explain how energy is conserved in systems through different modes of energy storage, including kinetic, gravitational, elastic, internal, and chemical. **Hmwk 9: TBD**
4/23 Tues		**#21** **Lab 10:** Skateboard simulation – explain

		conservation of energy and energy storage modes; apply your understanding to explain the case of a skateboarder on a ramp (describe how his energy storage modes change as he moves through the ramp; explain how his position on the ramp relates to his energy and speed). ***theory write-up**
4/25 Thurs		**#22** **Book Club #3!** **Concepts:** Power **Apply findings** to solve problems using concepts of energy and power **Hmwk 10: TBD**
4/30 Tues	Unit 7: Circular Motion	**#23** **Lab 11:** Centripetal Force -- determine the relationship between centripetal force and the velocity of an object moving in a circular path. Represent this relationship visually, graphically, and mathematically.
5/2 Thurs		**#24** **Concepts:** centripetal force, centripetal acceleration **Apply findings** to solve problems concerning objects moving in circles or around a curve. **Hmwk 11: TBD**
5/7 Tues	Unit 8: Momentum	**#25** **Lab 12:** Collisions – determine a relationship between the total momentum of objects before a collision and the total momentum of objects after a collision (consider different types of collisions: elastic, inelastic, equal mass, and unequal mass).
5/9 Thurs		**#26** **Concepts:** momentum, conservation of momentum, elastic and inelastic collisions **Apply findings** to solve problems about colliding objects. **Hmwk 12: TBD**
5/14 Tues		**#27** **Lab 13:** Why is momentum conserved in collisions? – explain conservation of momentum using intuitive ideas (such as "oomph"); apply your understanding to explain simple cart collisions on frictionless surfaces. ***theory write-up**
5/16 Thurs	*Last day of class	**#28** **Review:** Bring together ideas from previous units to solve problems involving motion (including circular motion), forces, energy, and momentum.
TBD	Final Exam	

*Course calendar is tentative and subject to change as instructor sees fit.