

Course Director:

Prof. Som Tyagi (tyagi@drexel.edu, DISQUE-806)

Course Overview:

This is the first of a three-course sequence teaching fundamental physics to engineering and science majors. Topics include: description of motion, inertial and non-inertial frames, Newton's Laws of motion, translational and rotational equilibrium, one- and two-dimensional motion, concepts of conservation of energy and momentum, and rotational kinematics and dynamics.

The learning of physics, like any other 'exact' science, is an exercise in clear, logical thinking. The practice of "doing physics" is about how to think through a problem using a small set of physical principles rather than how to quickly get the "right" numerical answer. In this course, we will emphasize a balance between quantitative numerical techniques and qualitative reasoning and explaining when solving physics problems.

Learning Outcomes: This course will address the Drexel Learning Priorities, including Communication, Information Literacy and Technology Use. Upon completion of this course, students will be able to:

- quantify the accelerated motion of a rigid point object using Newton's laws of motion;
- identify forces acting on a rigid point object and draw a free body diagram;
- understand free fall and circular motion;
- identify different forms of energy, calculate work, and apply conservation laws as a problem-solving strategy;
- apply Newton's laws to describe the rotation of a rigid object.

Textbooks: UNIVERSITY PHYSICS by H.D. Young and R.A. Freedman, 15th Ed. Pearson. (Note: There are several purchasing options for the textbook +[access code for online homework](#). For details, please see *Book Buying Options* on our course website.)

Course Website: learn.dcollege.net

NOTES:

1. **Recitation Assignment Problems** will be discussed during your weekly recitations.
2. **Homework:** All homework assignments are to be completed online. [An access code is required for online homework. Read the TEXTBOOK INFO and ONLINE REGISTRATION INFO document on our course website.](#)

COURSE SCHEDULE

WEEK	LECTURE TOPICS (Chapter-sections)	Recitation Assignment Problems
01 (04/06/20)	Ch.1, secs. 1-9 Units, Physical Quantities, and vectors. (Note: <i>sec. 10, scalar and vector products of vectors will be discussed later in the term</i>)	Chapter 1 10,13,25,28
02 (04/13/20)	Ch.2, secs. 1-5 Motion along a straight line. Introduce the concept of average and instantaneous velocity, and acceleration. Free fall.	Chapter 1 29,36,38,56,60,62
03 (04/20/20)	Ch.4, secs. 1-6 Newton's Laws of Motion Inertial and non-inertial frames, the three laws of motion. Free body diagram.	Chapter 2 23,36,49,65,76,77,78
04 (04/27/20)	Ch.5, secs. 1-5: Applying Newton's Laws Friction force, more on $F = ma$, including circular motion. Motion in accelerated frames.	Chapter 4 2,4,23,35,37,41,49
05 (05/04/20)	Ch.6, secs.1-4: Work and Kinetic Energy Energy and energy transfer. Definition of work done by a force (field). Work-kinetic energy theorem. Work done by conservative and non-conservative forces.	Chapter 5 7,31,45,50,62,74,108
06 (05/11/20)	Ch.7, secs. 1-5: Potential Energy and Energy Conservation Elastic and gravitational potential energies.	Chapter 6 3,12,22,64,71,74,85
07 (05/18/20)	Ch.8, secs. 1-5: Momentum, Impulse and Collisions Linear momentum and its conservation, impulse and momentum, collisions in one and two dimensions.	Chapter 7 11,29,40,41,43,57,58
08 (05/27/20)*	Ch.9, secs. 1-6: Rotation of Rigid Bodies Rotational kinematics. Relations between rotational and translational quantities.	Chapter 8 20,41,43,76,78,79
09 (06/01/20)	Ch. 10, secs. 1 - 6 Dynamics of Rotational Motion <i>Probs: Ch.10-22,42,59,63,72</i>	Chapter 9 1,13,24,47,49,78

Note: We expect changes to be made to this Syllabus. Any changes to the course will be communicated ahead of time to the class via e-mail or online announcements.

- May 25th is Memorial Day

QUIZZES: Two 50-min. quizzes will be given during the term. The quizzes will be given online either on Mastering Physics or Bblearn. The exact format and the times will be announced soon.

LABS: Obviously, we will not be able to do the usual labs since you cannot be physically present at Drexel. The lab portion of the course will be replaced by two or three Data Analysis projects.

FINAL EXAM: The final exam is comprehensive – it will be based on all the subject material covered in the course. However, the material covered during the last five weeks is given more emphasis.

Grading: The final course grade will be based on the following weights. (This is likely to be adjusted after we receive student input about their internet connectivity).

Two quizzes	35%
Pre-lecture assignments	5%
Learning Catalytics*	5%
On-line Homework	10%
Labs/Data analysis	10%
Final Exam	35%

PHYS-101 GRADING SCHEME

Grades Scored Between	LETTER GRADE
> 96 %	A+
93 % and Less than 96%	A
90% and Less than 93%	A-
86% and Less than 90%	B+
83% and Less than 86%	B
80% and Less than 83%	B-
76% and Less than 80%	C+
73% and Less than 76%	C
70 % and Less than 73%	C-
65 % and Less than 70%	D+
60 % and Less than 65%	D
Less than 60%	F

We do not curve grades, we will however adjust the grading scale to match up with breaks in the grade distribution. We will not raise the scale, but may lower it. However, you should not count on such adjustments.

Academic Integrity: Breaches of academic integrity, for example by cheating or plagiarizing, are serious infractions of the community standards of Drexel University. Refer to the following websites on academic integrity and the student code of conduct to understand expectations of students and consequences for violating these standards.

<http://drexel.edu/provost/policies/academic-integrity/>

https://drexel.edu/studentlife/community_standards/code-of-conduct/

Course Add/Drop Policy: If you need to drop or withdraw, the following websites will guide you through this process.

<https://drexel.edu/provost/policies/course-add-drop/>

<https://drexel.edu/provost/policies/course-withdrawal/> Drexel University

Other Resources: Note that Drexel University offers several resources to students in need. These include but are not limited to: Office of Disability Resources (ODR). Students with disabilities requesting accommodations and services at Drexel University need to present a current Accommodation Verification Letter (AVL) to the instructor before any accommodation can be made. AVLs are issued by ODR. Additional information can be found at:

<http://drexel.edu/oed/disabilityResources/students/>

Health Center and Student Counseling: If you need help with health or mental health, please visit the following websites for specific information on resources available through Drexel:

<http://drexel.edu/counselingandhealth/student-health-center/overview/>