

Physics 115 Sec. 001: Descriptive Physics
(v. 24 August 2015)

LECTURE: MWF 10:30 a.m. – 11:20 a.m. in 136 Jorgensen Hall

INSTRUCTOR: *Anthony F. Starace*, 310Q Jorgensen Hall

Tel. (402) 472-2795; Email: astarace1@unl.edu

OFFICE HOURS: Mondays & Fridays 2:30pm – 3:30pm, Wednesdays 2:30pm-3:00pm or by appointment.

REQUIRED TEXT AND CLICKER:

OPTION #1: *How Things Work: The Physics of Everyday Life*, 5th Edition (Wiley, 2013) by Louis A. Bloomfield (ISBN 978-1118-23776-2, 571 pages, paperback) + **Wiley-Plus Code for How Things Work** (ISBN 9781118569122)

OPTION #2: *How Things Work: The Physics of Everyday Life*, 5th Edition (Wiley, 2013) by Louis A. Bloomfield **With Wiley-Plus Code** (ISBN 978-1118-56912-2 online text + Wiley-Plus Code)

Note: Bloomfield has a similar book entitled “How Everything Works: Making Physics Out of the Ordinary.” Do not confuse the text for this course with that book.

MPS iClicker2 (ISBN 9781429280471). *Instructions:* Once you have an iClicker, go to Blackboard and open the page for Physics 115: Descriptive Physics. In the left hand red menu there is a link labeled “Clicker Registration.” Click on that link and register your clicker.

GRADES:

Your grade in this course is based on your results in three in-class hour exams (15% each), the final exam (30%), the homework assignments (15%), and class participation and attendance (10%). Note that participation and attendance is required and will be counted by use of the clickers during each class. Preparation for class is rewarded by more points being given for correct answers to questions posed in class. However, even incorrect answers are accorded participation points.

EXAMINATIONS:

Hour Exams will take place on Wednesdays of September 30th, October 28th, and December 2nd during class period.

Final Exam is scheduled on Friday, December 18th, 10:00 a.m. – 12:00 Noon

WEB PAGES:

The web page for this course is on Blackboard. On the left-hand menu of this course’s web page, the item labeled “External Links” takes you to resources provided by the publisher and the author. Once you purchase WileyPlus, you must register for this course by going to the following link: <http://edugen.wileyplus.com/edugen/class/cls457664/>

TENTATIVE SYLLABUS (as of 24 August 2015):

TEXT: *How Things Work: The Physics of Everyday Life*, 5th Edition (Wiley, 2013) by Louis A. Bloomfield

PLANNED COVERAGE (Note that this listing of topics may be revised during the semester.)

Chapter 1 The Laws of Motion, Part 1

Section 1.1 Skating; Section 1.2 Falling Balls; Section 1.3 Ramps

Chapter 2 The Laws of Motion, Part 2

Section 2.1 Seesaws; Section 2.2 Wheels; Section 2.3 Bumper Cars

Chapter 3 Mechanical Objects, Part I

Sec. 3.1 Spring Scales; Sec. 3.2 Bouncing Balls; Sec. 3.3 Carousels and Roller Coasters

Chapter 5 Fluids:

Section 5.1 Balloons; Section 5.2 Water Distribution

Chapter 7 Heat and Phase Transitions

Sec. 7.1 Woodstoves; Sec. 7.2 Water, Steam, and Ice; Sec. 7.3 Clothing, Insulation, and Climate

Chapter 8 Thermodynamics

Sec. 8.1 Air Conditioners; Sec. 8.2 Automobiles

Chapter 9 Resonance and Mechanical Waves

Section 9.1 Clocks; Section 9.2 Musical Instruments; Sec. 9.3 The Sea

Chapter 10 Electricity

Sec. 10.1 Static Electricity; Sec. 10.2 Xerographic Copiers; Sec. 10.3 Flashlights

ACCOMMODATION FOR STUDENTS WITH DISABILITIES

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY. The SSD web page is at this URL: <http://www.unl.edu/ssd/>

ACE CERTIFICATION

This Course has been certified by the Achievement Centered Learning program at UNL to satisfy Student Learning Objective 4: Use of scientific methods and knowledge of the natural and physical world to address problems through inquiry, interpretation, analysis, and the making of inferences from data, to determine whether conclusions or solutions are reasonable.

The main focus of the course is on the appraisal of physical systems to arrive at a comprehensive understanding of relationships between the systems and their behavior. This process can be separated into four distinct phases. The first phase consists of an inquiry into what is the system and its essential components, what are the available data (which are obtained from the statement of a problem, or diagrams or graphs, or reference tables, or some combination of these), and what are the key physical principles and laws governing the system. The second phase is to interpret the physical principles and laws and data in order to determine what inferences can be drawn from the data, what are the appropriate relationships between the known and unknown quantities, what intermediate information must be obtained, and what constitutes a complete analysis. The third phase is to carry out such a complete analysis by suitably descriptive and/or quantitative means. Critical evaluation of the reasonableness of the conclusions is the essential fourth and final phase. This evaluation consists of judging whether the answer is within reasonable physical limits and checking that the predicted behavior is a logical consequence of the nature of the system and is consistent with the key physical principles and laws identified in the first phase.

Student abilities for appraising physical situations is assessed in several ways. The course grade is based on a cumulative score that is derived from the following components: (i) Peer Instruction (PRS) questions posed during the lectures, (ii) homework assignments, (iii) three hour exams, and (iv) a comprehensive final exam. The PRS questions and the homework exercises focus on specific knowledge, basic computational skills, and grasp of key concepts. The students' integrative understanding of physical principles and problem-solving is assessed by means of the three hour exams and the comprehensive final exam.

Sampling of outcomes for purposes of curriculum review:The purpose of this review is to help faculty improve student learning outcomes. A small sampling of student work will be selected, identifying information removed, and archived for later review. Any students in ACE courses do not wish their work selected should notify the instructor.