Physics 013, Conceptual Physics, Spring, 2020, syllabus

**Brief description:** One-semester conceptual survey. Topics selected from mechanics, electricity, magnetism and modern physics. The course was originally for students in the College of Nursing and Health Sciences. It can also fulfill physics requirements in some cases of other colleges.

**Textbook:**

You must have the MasteringPhysics access code for this class! You can log on to [http://www.masteringphysics.com](http://www.masteringphysics.com) once you have the student access code. Our course is “MPYANG3567944” and you need to register to that course for our class.

**Class Materials:**
In addition to materials in the textbook, Blackboard will pose relevant additional class materials. We exclude some chapters and sections of the textbook. Details will become clear in classes. Thus, it is important to study materials posted on Blackboard. In class, we will go over detailed guidelines on how to study class materials.

**Instructor:** J. Yang  
Innovation E221;  
email: jyang@uvm.edu.

*Office Hour: TR: 1:30 – 2:40 PM; Innovation E221, or by appointment.*

**Schedule:**
Lectures: TR, 2:50 – 4:05 PM  
LAFAYE L411.

**Lectures:**
In lectures we will concentrate on concept building and problem solving. We will also work on concepts and problems to prepare for exams.

**Exams & Homework assignments.**
There are three in-class exams and a final exam, all close-booked. Exams are based on homework assignments and examples in lectures. There will be an information sheet for each exam. Course Materials on Blackboard will post the same information sheet in advance.

All MateringPhysics assignments have **deadlines**. Check MasteringPhysics course page for details. You must be diligent; do and finish each assignment before its **deadline**. Assignments will be available for you to study after the deadline. No credit for any attempt after the deadline.

**No excuse for missing any exam. Any medical excuse must be cleared with the instructor.**

Exam schedule: please refer to course plan.
Final exam will be all-inclusive.

The subject coverage for each in-class exam will be discussed in lectures. A summary of involved topics is in “course objectives” below.

Reading:
You should read materials in the textbook and posted on Blackboard before each class. The lecture will be more useful if you have also attempted homework problems.

Class Grades:
The average of all MasteringPhysics homework problems together counts 15% (Note: the count of HW grade is by total problems, not by assignments). Average in-class quizzes count 10%. Each in-class exam counts 18%. Final exam counts 20% Class attendance counts 2%.

Anyone who misses the final exam will get the grade F for the class.

All exams and in-class quizzes are close-booked. Each exam will have an information sheet. Some quizzes may have certain information provided.

Only pencil or pen is allowed for all exams and quizzes. Calculators are not needed and, hence, not allowed in all exams and quizzes.

Exam and quiz grades will be posted on Blackboard. Grades of Mastering Physics assignments are recorded on MasteringPhysics site.

Other: University regulations concerning academic honesty apply to all work in this course.
The course plan.

Week1 (1/14, 1/16) Chaps. 3&4. Q1 (1/16, Thursday) MP: C3&4 (Saturday, 1/25).
Week2 (1/21, 1/23) Chaps. 5, 6&7. Q2 (1/23, Thursday) MP: C5, 6&7 (Saturday, 1/25).
Week3 (1/28, 1/30) Chaps. 8, 9&10. Q3 (1/30, Thursday) MP: C8, 9&10 (Saturday, 2/1).

Week4 Exam1 (2/4 Tuesday).

Week4 (2/6) Chap. 22.
Week6 (2/18, 2/20) Chaps. 23&24. Q5 (2/20, Thursday) MP: C23 (Saturday, 2/22).

Week7 Exam2 (2/27, Thursday).


Spring Break (3/9 – 3/13)


Week11 Exam3 (4/2, Thursday).


Final Exam, Thursday, 5/7/2020, 1:30 - 4:15 PM, LAFAYE. L411.
Homework Assignments.

Chap. 3: 44, 46.
Chap. 4: 48, 50, 51, 54, 56.
Chap. 5: 32, 33.
Chap. 6: 30, 31, 34, 35, 37, 38.
Chap. 7: 41, 45, 48, 50, 53, 54.
Chap. 8: 44, 45, 46, 49, 54.
Chap. 9: 41, 45.
Chap. 10: 36.

Exam1 (2/5 Tuesday).

Chap. 22: 36, 38, 42, 45, 46, 47.
Chap. 23: 54, 55.
Chap. 24: Right-handed rules.
Chap. 25: 46.

Exam2 (2/28, Thursday).

Chap. 19: 38, 39, 42.
Chap. 20: 34, 35, 41.
Chap. 21: 24, 28, 29.
Chap. 26: 37, 39, 40.
Chap. 27: 52, 53, 59.
Chap. 28: 39, 40, 41, 46.
Chap. 29: 35.

Exam3 (4/4, Thursday).

Chap. 31: 23, 24, 25, 32, 33, 38.
Chap. 32: 21, 22.
Chap. 33: 38, 39, 40, 42, 51, 70.
Chap. 34: 33, 34, 37, 45.
Chap. 35: 38, 39, 41, 48.

Final Exam, Thursday, 5/7/2020, 1:30 - 4:15 PM, LAFAYE. L411.
Physics 013, Conceptual Physics, Spring, 2018, course objectives.

Course logistics.
All exams and in-class quizzes are close-booked. An information sheet will be provided for all exams.
Only pencil or pen is allowed for all exams and quizzes. Calculators are not needed and, hence, not allowed in all exams and quizzes.
Exam and quiz grades will be posted on the blackboard. Grades of Mastering Physics assignments are on MasteringPhysics site.
Schedules for all quizzes and exams are on the syllabus.
Unannounced quizzes are rare and only for extra bonus grade points.

In-class quizzes are to help conceptual understanding of class materials. Answers to each quiz will be on Blackboard immediately after the quiz.
Each exam will include materials in earlier quizzes.
Hints and answers to assigned homework problems will be on Blackboard immediately after MasteringPhysics deadline.

Learning objectives (specific).
Major learning objectives are closely associated to each exam. The syllabus indicates the coverage of selected chapters of the textbook before each exam. The following is a summary of course learning objectives.

Exam1, Mechanics.
- Learn the definitions of terms and differentiate the difference between:
  - Displacement and distance.
  - Velocity and speed.
- Understand notations of kinematics equations.
- Vector notation. Draw a vector in 2-D. Learn vector addition rules in 2-D by drawing.
- Learn the particle model where a point particle represents an object of interest.
- Understand Newton’s laws of motion.
- Introduction of momentum, kinetic energy and potential energy.
- Understand energy diagrams.
- Model a rigid body object as a uniform linear rod.
- Basics of the gravity.

Exam2, Electricity and Magnetism.
- Coulomb’s law and electrostatic forces on charged particles.
- Introduction of the electric field and electric potential.
- Brief discussions of the concept of field lines and their relationships to electric fields and potentials.
- Understand the electric potential energy and electric static energies of a system of charged particles.
• Understand electric current and learn names, functions and symbols of circuit elements.
• Introduction of Ohm’s law.
• Learn static magnetic fields and static magnetic forces.
• Right-hand rules to determine the direction of magnetic fields.
• Right-hand rules to find the direction of magnetic forces on charged particles and current-carrying conducting wires.
• Learn electromagnetic induction.

Exam3, Sound and Light.
• Learn basics of oscillation and harmonic waves.
• Understand the propagation of waves in space.
• Introduction of fundamentals of intensity units of sound and light.
• Understand Ray-like property of visible light.
• The basics of reflection and refraction (Snell’s Law) of visible light at flat interfaces.
• The fundamentals of the lens equation and its application in image formation.
• Understand wave property of light.
• Understand the superposition of waves and the wave interference effect.

After Exam3, Modern Physics.
• Introduction of the quantization of light and Planck’s constant.
• Introduction of the basics of earlier quantum physics.
• The basics of atomic physics.
• The basics of nuclear physics: X-rays and radioactivity.
• Nuclear fission and fusion.
• Brief introduction of Einstein’s special theory of relativity.