PHYS 180: Introductory Modern Physics
Fall 2010, MWF 12:40-1:35, TCCW 237
Online: physics.wku.edu/~gibson/phys180
Instructor: Dr. Steven Gibson
Office: TCCW 231, Phone: 745-3019
Email: (first).(last) (at) wku.edu
Office hours: M 1:50-3:50pm, or by appointment

Pre-requisites: MATH 117 (Trigonometry) or MATH 118 (College Algebra + Trig)
Co-requisites: PHYS 181 (Intro Modern Physics Lab, W 10:20-12:20, TCCW 205)
(Lab manual should be at bookstore tonight – please get by Wed morning!)
Gen-Ed D-I: 3 credits for General Education Natural Sciences - Mathematics requirement

Description: This course surveys the physics revolution responsible for laptop computers, fiber optics, and nuclear power. Using the atomic structure of matter as a unifying theme, we will touch on concepts underlying motion, forces, energy, chemistry, electricity, magnetism, waves, particles, relativity, and quantum mechanics. As a natural part of this exploration, we will consider what it means to think like a physicist, the development of modern physics concepts, and their impact on society at large. A keen curiosity coupled with scientific skepticism are highly desirable traits for students in this class.

Textbooks: Pictured at top. We will closely follow the required text and will draw on supplementary texts as appropriate.


• Supplemental: Mr. Tompkins in Paperback, by George Gamow (Cambridge University Press, ISBN-10 0521447712)


Grading Method: Letter grades for the course will be assigned using the scheme shown at left below. Grade thresholds may be lowered but will not be raised. The relative weights of the course components contributing to the final course score are listed at right below.

<table>
<thead>
<tr>
<th>% Avg Score</th>
<th>Grade</th>
<th>Course Component</th>
<th>Grade Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 - 100</td>
<td>A</td>
<td>homework assignments</td>
<td>25%</td>
</tr>
<tr>
<td>80 - 89</td>
<td>B</td>
<td>in-class exercises, quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>70 - 79</td>
<td>C</td>
<td>block exams (3 × 15%)</td>
<td>45%</td>
</tr>
<tr>
<td>60 - 69</td>
<td>D</td>
<td>final exam</td>
<td>20%</td>
</tr>
<tr>
<td>0 - 59</td>
<td>F</td>
<td>colloquia (extra credit)</td>
<td>variable</td>
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Assignments

- **Homework:** Problems will be assigned from the main text and occasionally other sources. You are expected to work completely on your own, without assistance from other students. Variations on homework problems may appear in exams. As a general rule, homework solutions will not be posted. The burden is on you to make sure you find out how to solve the problems by getting help before they are due or asking about them in class. Homework is due at the beginning of class. Late submissions will not be accepted.

- **Reading Quizzes:** You are responsible for reading assignments I will give in class. These are intended to familiarize you with material before it is covered in lecture or class discussions, so that you can grasp important points as they arise rather than frantically trying to note down everything that is said. I will give reading quizzes worth a small fraction of your total grade to encourage you in this regard.

- **In-Class Exercises:** Occasionally, there may be additional in-class activities. Some of these will be group conceptual or problem-solving exercises for “participation points” rather than a grade. Others may be graded. A diligent effort on the homework and exercises is the best approach to a successful learning experience in this course.

- **Colloquia:** Extra credit will be given for attending Physics & Astronomy Department talks by students, professors, and visiting scientists. Points will be awarded for each such talk for which the instructor personally registers your presence (no card scanners). Colloquia are given each Monday at 4:00pm in TCCW 250, with snacks at 3:45pm in TCCW 238 (the SPS room). Additional talks that may also be credited include the Feast of Facts gatherings on alternate Fridays at 3:00pm, or other special events announced in class.

**Examinations** assessing your knowledge of course material account for the majority (65%) of your course grade. A guide on how to prepare for and take physics exams will be provided separately.

**Block Examinations:** Three exams will be given during the semester on successive “blocks” of material. Each block exam is worth 15% of your course grade. The exact dates and topics for each exam are subject to change, but may resemble the following:

<table>
<thead>
<tr>
<th>Block Exam</th>
<th>Material (may change)</th>
<th>Date (may change)</th>
</tr>
</thead>
<tbody>
<tr>
<td># 1</td>
<td>mechanics, gas laws, atoms [Ch. 1 - 5]</td>
<td>Monday, September 27</td>
</tr>
<tr>
<td># 2</td>
<td>E&amp;M, electrons, waves, light [Ch. 6 - 9]</td>
<td>Monday, November 1</td>
</tr>
<tr>
<td># 3</td>
<td>relativity, photons, x-rays [Ch. 10 - 13]</td>
<td>Friday, December 3</td>
</tr>
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</table>

**Final Examination:** The final exam for the course will be comprehensive: it will cover material from the first three exams plus any new material (like quantum mechanics [Ch. 14 - 17]). The final exam will be given according to the University-mandated schedule, which as of this writing is listed online as:

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Normal Day/Time</th>
<th>Final Exam Date &amp; Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 180-001</td>
<td>MWF 12:40</td>
<td>Tuesday, December 14, 1:00 - 3:00 pm</td>
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</table>
Problem Credit: One important goal of this course is to get you thinking and communicating like a physicist, including in the core area of problem solving. On homeworks or exams, you need to do more than just write down the answer to a problem to receive full credit. I want to be able to follow your reasoning so I can see how you got what you got. In this way I can also give partial credit for wrong or incomplete answers if I can tell you were on the right track. All numerical problem solutions should include the following elements:

1. A sketch or graph of the situation with suitable labels
2. Appropriate algebraic equations (no numbers!) relating known & unknown quantities
3. Solved equations with proper numerical values & units for known quantities
4. Numerical answer for the “unknown” you were trying to find, including proper units

Lecture Attendance: Regular and punctual attendance is expected of everyone during every class meeting and is rewarded through class participation exercises and quizzes that count toward your final grade. You will be responsible for material missed in your absence. Lecture notes must be obtained from a classmate.

Exam Attendance: As a general rule, make-up exams will NOT be given except for very unusual circumstances. If you are unable to take an exam, you MUST request to schedule a make-up exam by asking permission from the instructor BEFORE the regularly-scheduled exam period (except in the case of unforeseen circumstances). A serious reason is required to warrant the scheduling of a make-up exam.

Drop/Audit Policy: Due to the nature of this course, it cannot be audited. If you choose to not complete the course for a grade then your only option is to drop the course and receive a grade of W by the University deadline for dropping a course. If you choose to drop this course, you MUST also drop the lab, since they are co-requisites.

Disability Policy: In compliance with university policy, students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services in Downing University Center, A-201, telephone 270-745-5004 V/TDD. Please do not request accommodations directly from me without a letter of accommodation from the Office for Student Disability Services.

Classroom Policy
- Food and drinks are NOT allowed in the classroom
- Cell phones, pagers, and similar devices must be turned off and stored away during class time
- The classroom laptop computers are for specific classroom activities ONLY!
  - Do not install or modify any software on the laptop computers.
  - Do not use the computers to check email during class time.
  - Do not use the computers to instant message or chat with anyone ever.
  - Do not submit or view homework assignments on Mastering Physics during class time.
  - Do not browse the internet during class time unless it is part of a class activity.