

COURSE SYLLABUS:
Physics 201 Sections B
“Physics for Science and Engineering”
(calculus-level physics with laboratory)

Course Title: Physics for Science and Engineering

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Course webpage: <http://www.instruction.greenriver.edu/physics/keith/201>

Office	Monday, Tuesday	9:00 AM - 10:00 AM	Nelson SC, Room 114
Hours:	Wednesday	10:00 AM - Noon	Nelson SC, Room 114
	Thursday	3:00 - 4:00 PM	Nelson SC, Room 114

Class Meetings:

Section B:	SC 117	MTThF	1:30 PM – 3:00 PM
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Course Objectives: Successful students will develop skills in the following areas.

1. **Critical Thinking:** Understanding a physical problem requires construction of a mental model and identification of relevant and irrelevant details. It is necessary to consider both *what you think you know* and *how you think you know it*. This is what is meant by critical thinking. Manipulation of the facts associated with these details is often relatively easy, but we must also learn...
2. **Problem Solving:** To pass this course, it is not sufficient to merely learn *about* physics. It is also necessary to learn *to do* physics. This course will require refinement of problem solving techniques and the development of methods which new ones. Still, each method and technique is simply a tool to be used by a creative and practiced problem solver.
3. **Technical Writing:** Technical skill is of little use if it cannot be communicated. The clear and accurate written expression of ideas, using the combined languages of English and mathematics is an essential part of this course. Work will not be given full credit unless all steps can be understood!
4. **Laboratory Investigation:** Laboratory work will be a very large part of this course. Students will complete several laboratory exercises per week as well as designing and carrying out their own projects. All students will be tested on their abilities to design, carry out, and interpret experiments.
5. **Team work:** The laboratory work will be completed by teams working together. It will be the responsibility of each member of the team to see that all members work together, to see that all members participate, and to see that all members of the team understand all phases of the work.

Relationship to Campus-wide objectives:

Green River Community College has identified several educational objectives for all courses and all students on the campus. The objectives of this course include many of these campus-wide objectives which will be directly and indirectly monitored and assessed. These overlapping objectives include enhancement of proficiency in the following areas:

1. **Critical thinking and problem solving skills:** If there were only one objective to this course it would not be the retention of any fact that is associated with the subject matter called physics. It would be the development of skills needed to analyze any problem carefully, logically, analytically and creatively, with a hopeful eye toward the creation of a viable problem solving strategy.

Critical thinking and problem solving skills will be assessed using graded homework assignments, essays, quizzes, exams, laboratory exercises, and ungraded assessment tests.

2. **Mathematical and quantitative reasoning:** Successful completion of this course requires the mathematical modeling of many complicated situations, often using models which are not intuitively obvious. Students often comment that physics courses stretch their ability to translate from the real world to mathematical abstractions and back again more than any other.

Mathematical and quantitative reasoning skills will be assessed using graded homework assignments, quizzes, exams, laboratory exercises, and ungraded assessment tests.

3. **Clarity of communication and written expression:** Verbal exposition is often put to its most stringent test when technical material must be accurately and yet readably described. This course requires written discussion of highly technical subjects and precisely defined concepts, often blending the English language with the language of mathematics.

Communication and written expression skills will be assessed using graded homework assignments, essays, essay questions on exams, and presentations and written reports on laboratory exercises.

4. **Responsibility:** All students will be responsible for doing their own work *and seriously thinking about what they are doing!* Although it is tempting, especially in laboratory situations, to allow others to do our work for us, the successful students will be those who actively participate in all activities. Previous students have found it very difficult to make up for lost time in this class, so it is important for all students to work at least at the same pace as the rest of the class.

Students often believe that brain power alone determines performance in physics class. This is not the case! Before an anonymous in-class test, students were asked to estimate the fraction of the work that they had personally completed. Students who completed less than 80% of the course work averaged only 35% on the exam. Those who completed all of the course work averaged 80%.

5. **Aesthetic appreciation:** The teacher of this class freely pursued the study of physics when a career in engineering or any number of other fields would have been much more lucrative and required less formal education. The reason for this was simply a deep and abiding love for the astounding beauty of the subject matter. Your teacher sincerely hopes that some appreciation of this beauty will rub off on each and all of his students, although aesthetic appreciation will not be directly assessed.

Aesthetic appreciation of physics will be assessed in part through the work done in preparing and presenting an in-class work of the students choice and design.

Prerequisites:

Do you need High School Physics or equivalent? Yes. Students without some physics background find the level and pace of Physics 201 very difficult. Some very good students find it necessary to drop Physics 201, take Physics 110 first, and then return to do extremely well in Physics 201, 202, and 203.

Do you need Calculus, or concurrent enrollment in Math 124? Definitely. Students often ask if they can pass the course without calculus. Maybe some could, but Isaac Newton was one of the smartest men who ever lived, and he could not do physics without calculus. This is not a math course, but calculus will be an essential part of the language used to describe the physical world.

Textbooks:**1. *Understanding Physics*, by Cummings, Laws, Redish, and Cooney. REQUIRED!**

Your instructor apologizes for the price tag, but you should keep in mind that this is also the text for Physics 202, 203, and 208. **You should also know that as of the last time I checked, the price in the college bookstore was lower than most of the prices available online!** Since it takes so long to say “Cummings, Laws, Redish, and Cooney,” this book will be referred to as “Cummings” or “CLRC”. This is a very useful reference book, and any student planning to continue study in physics, chemistry, or engineering is advised to keep this book for future reference (the money you get by selling it back will not pay for a replacement book if you decide you need one later!).

2. *Physics 201 Interactive Exercises*, by GRCC Faculty REQUIRED.

Your instructor wrote most of this himself so it must be good.

Supplemental Reading Material:

Students often request alternative reading material to supplement their general texts. Additional physics texts can be found in the Physics Store Room (SC 118) and students are encouraged to use them if they believe this will help. Several calculus level physics texts are available for check out. These include textbooks by Serway and Jewett, Halliday and Resnick, Knight, and Walker.

However: students should be aware that there is little evidence that time spent *reading* another book is going to substantially increase your understanding or your grades. It is much better to spend extra time *doing* more physics problems, *discussing* the things that you find confusing, and *asking yourself* the kind of critical thinking questions modeled in the books by McDermott or Sokoloff and Thornton!

There are very few *facts* that you need to learn for this class. It simply requires time and effort to really understand and use the facts that you will learn.

REQUIRED COURSEWORK:**Laboratory requirements:**

Most laboratory work will be based on the exercises in the *RealTime Physics* laboratory manual. These exercises are designed to illustrate and clarify the concepts of physics and not to test the laboratory skill of the students. Thus the laboratory grade will be based on participation and assessment of student understanding. Laboratory exercises will be collected periodically, and there will be at least one laboratory quiz. Students are REQUIRED to work together in groups during lab exercises.

Later in the term there will be many laboratory exercises that will *not* come from *RealTime Physics*. These will often require more thinking and writing on the part of the students and these labs will be impossible to make up late. These labs will be graded generously but they will be graded.

Attendance: Attendance is absolutely *required* for the laboratory component of this course. Students who miss a single lab may lose 10% of their lab grade. Students who must miss more than one lab may have difficulty passing the course!

Meeting times: There will be one laboratory period almost every week. Lab periods will occupy almost half of the class periods. Students in these classes are often confused about which classes are classes and which are labs. THIS IS A GOOD THING! You will learn the most by doing and thinking, not by sitting and taking notes (although you need to do that, too!)

Grades: Most of the lab grade will come from successful attendance and participation in lab exercises. Some lab work will be collected and graded, and there will also be one lab “quiz” in which students will need to demonstrate that they know how to use the equipment. (WARNING: If you allow your lab partners to do all of the “hands-on” work during lab, you will not pass this quiz!)

Homework (problem sets):

There will be 8 or 9 problem sets from CLRC assigned throughout the course of the term. There may also be problem sets from other sources. Some homework assignments will require the use of a computer either on this campus or at home. ***You are not required to do the homework individually! In fact you are encouraged to work together!*** Identical homework will be accepted if each is written in the hand of the author. Photocopies or computer reproductions will not be accepted. Every attempt will be made to get the results of the graded homework back to you as quickly as possible, but there are no guarantees. To facilitate rapid return of the homework the instructor may select only a fraction of the assigned problems to grade or a student grader may be used, or quizzes over assigned homework may be used. The instructor will review and keep responsibility for the grades assigned.

Quizzes:

There will be 8 or 9 quizzes given throughout the term. Each classroom quiz will contain one long or several short questions, intended to be easily finished in 30 minutes, however take-home quizzes may also be given and these will in general be longer and more involved.

Since it is the purpose of quizzes to assess what individuals have learned, each student must do his or her own work. Copying or cheating on classroom quizzes will result in failed grades and submission to the campus cheating policy.

Exams:

Exams may not be taken late. If you have a problem with the timing of a scheduled exam, contact your instructor *in advance*. There will be one midterm exam roughly five weeks into the quarter (the exact date will be announced well in advance). It will be 90 minutes long. Students are required to do their own work on exams. Failure to do so will result in *failed grades* and discipline under the policy on cheating. **The final exam will be held at the times printed in the quarterly course schedule:**

Section B	Wednesday, December 9th	1:00 PM – 3:00 PM
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Class Participation:

There is overwhelming evidence that physics students (strong ones and weak ones) learn more when they teach themselves and teach each other. You are expected to answer questions in class, speak to each other during class discussion times, and work together cooperatively during lab times. **THE LANGUAGE OF PARTICIPATION IN THIS CLASS IS ENGLISH!** Students should expect to lose some or all of their participation points if they insist on speaking other languages (sorry, but that's a college policy). Feel free to ask for help with English or to use dictionaries and translators *during class time*. As with collaboration, you may not use dictionaries and translators during quizzes or exams.

Attendance and tardiness:

This class will not be graded on attendance, but students should be aware that due to the “hands-on” nature of what is done during class, it is very difficult to pass the class if attendance is lacking. Even students who do not believe they need to attend usually miss out on learning when they miss class.

If you must arrive late to class, come in quietly, sit down, and shut up! Do not start conversations. Do not ask the people around you what is going on. This is very disturbing to those who are trying to learn.

Extra Credit Projects:

There will be NO EXTRA CREDIT PROJECTS THIS TERM!!! None will be accepted. Don't ask. Students who have extra time that could be devoted to an extra credit project should devote that time to learning the material in the course. With all of the books and teaching materials available, there should be a mode of learning that suits every student. Take advantage of it and concentrate on learning the basics rather than spending time on additional subjects

Grades:

Grades for this class will be computed numerically based on the fraction of a total of 100 possible points. Grades will be awarded for the following six components, with the indicated points for each:

Course component:	Fraction of grade:
Homework	20 points
Quizzes	20 points
Midterms	20 points
Laboratory exercises	10 points
Class Participation	10 points
Final Exam	20 points

Note that these point totals are subject to change if the instructor believes it would be to the benefit of the class (and the grades of the class) as a whole.

So how many points do I need to get an A? To pass?

Numerical grades will be computed based on the following mathematical formula:

Take your total number of points. Subtract 56 points (ouch!). Divide by ten.

For quick reference, you may also look up grades in the following table:

Percent of Total Points	Numerical Grade		Percent of Total Points	Numerical Grade		Percent of Total Points	Numerical Grade
97-100	4.0		86	3.0		75	1.9
96	4.0		85	2.9		74	1.8
95	3.9		84	2.8		73	1.7
94	3.8		83	2.7		72	1.6
93	3.7		82	2.6		71	1.5
92	3.6		81	2.5		70	1.4
91	3.5		80	2.4		69	1.3
90	3.4		79	2.3		68	1.2
89	3.3		78	2.2		67	1.1
88	3.2		77	2.1		67	1.1
87	3.1		76	2.0		66	1.0
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Students are strongly encouraged to keep track of their own progress in this class. At any point in the course, students may compute their *average percentage* on completed material and use this table to estimate a grade. Students should note, however, that it is ultimately your instructor who makes the decision as to how many points each student actually has! Grading is a subjective exercise and the grade you receive may not be *exactly* the one that you calculate for your self.

Every attempt will be made to let you know what was and was not an acceptable score on the material that is handed back to you. Students should be forewarned that grades below 50% are not uncommon on individual quizzes and taken by themselves are not disastrous (providing there are other grades to lift the overall average). An *estimate* of your current grade will be distributed after the midterm is returned. Please remember that this is only an *estimate*.

A grade of "I" will only be given in emergency situations and only if at least 75% of the work is completed satisfactorily. *Note that a grade of "I" cannot be given simply to save a grade point average! There must be a REASON for requesting an incomplete.*

A grade of "P" or "NC" can only be given if requested in writing at the registrar's office before the deadline printed in the quarterly schedule. Students should know that completion of a course with a grade of "P" is usually *not* considered completion of a prerequisite for another class.

Students are NOT obligated to tell their instructors when a course is being taken for a P or NC grade!

Late homework, exams, etc.:

Exams and quizzes cannot be made up except in extraordinary circumstances. If a student knows that a forthcoming exam will compete with an urgent scheduling conflict, the student must notify the instructor *in advance!* In some cases it will be possible to make special arrangements for that student.

Homework will be accepted on the day after it is due, but full credit will not be given. Roughly 20% of the possible points will be deducted from homework turned in on the class day after it is due IF THE SOLUTIONS HAVE NOT YET BEEN DISTRIBUTED!

Due to the nature of laboratory work, it will often be impossible to make up a late laboratory. Again, students who know of their inability to attend a specific lab should tell the instructor in advance. **No late work will be accepted during (or after) the last two weeks of the school term.**

Material Covered:

The schedule for material covered in this course will be roughly the following:

Time (approx.):	Subject:	CLRC Chapters
WEEK 1:	Science, Measurement, and Units	1
WEEK 2:	Coordinates, Position, and Motion	2
WEEK 3:	Velocity and Change in Velocity	2 & first part of 7
WEEK 4:	Forces and Many-body interactions	3 & first part of 8
WEEK 5:	Motion in 2 or 3 dimensions	4 & first part of 5
WEEK 6:	Forces in many dimensions	5
WEEK 7:	Applying Newton's laws	6
WEEK 8:	Conservation laws	7, parts of 9 & 10
WEEK 9:	Work and Kinetic Energy	9
WEEK 10:	Potential Energy	10

Material may be added or removed from the schedule as time and interest allow.

“Guests” in the classroom:

Due to GRCC policy, no one who is not either registered for the class or an employee of GRCC will be allowed in the classroom during lecture or laboratory periods. This includes children, friends, visiting students, and prospective students. The only exceptions that will be made will be in the cases of students who require the assistance of others for the completion of essential classroom tasks or for students who are registered for another section of Physics 201 but have made arrangements with their teachers to attend at a special time.

Outside help:

Physics students are encouraged to make use of tutoring services should they find the need for outside help. As of this writing, GRCC has not chosen an official physics tutor but there are many talented students available. Physics help may be found in the tutoring center on the second floor of the Holman Library. Students who have trouble with the mathematics associated with their physics work may find additional help in the Math Learning Center (SMT 355).

Again, you are strongly encouraged to use your classmates as sources of outside help. *There is ample evidence that talking to your classmates is the best source of clarification and understanding because it will force YOU to think through your own difficulties, often removing confusion and solving problems at the same time! When all else fails, remain calm, sit back, and THINK!*

Class breaks and interruptions:

Official class breaks are required for all class periods of length two hours or longer. Since our class meetings are between one and two hours long, class breaks are optional, *and official class breaks will usually not be scheduled!*

However, if you need to leave the classroom, stretch, take a break, please do so. This is much better than falling asleep during class and disturbing your neighbors with an annoying “thud” when your head hits the table. Try to take your breaks in a manner that disturbs your colleagues as little as possible.

Discipline:

If anything happens in class that you feel might require disciplinary action, **please talk about it!** Talk to each other. Talk to your teacher. We will all be better off if we can settle differences without official disciplinary procedures. This section of the syllabus is about what happens if that fails.

Standard Procedure: You should be aware that the standard course of discipline at GRCC begins with a student's expulsion from the classroom for **three class periods**. If those class periods include exams, quizzes, or other assignments then the student will **receive a score of zero** on those assignments.

The law: You should also know that due to changes in the law, students may be *legally liable in a court of law* for words or actions that might create an atmosphere viewed as hostile by other students.

Disruptions: In accordance with GRCC policy, students who disrupt the academic atmosphere of the class will be asked to leave and will be referred to an academic dean for further action. Disruptions of academic atmosphere include any behavior that interferes with the ability of faculty or other students to perform the work necessary for this class.

Inappropriate discussion: Discussions in the classroom should concern matters relevant to the class or topics of general interest that are not demeaning or insulting. Courts have ruled that explicitly sexual discussions lead to an academically hostile atmosphere (see paragraph beginning with "The law", above). *Comments, discussions, or actions of a racist, sexist, or otherwise degrading nature will absolutely not be tolerated. Be careful about your use of words such as gay, black, white, etc.* Again, if you feel there are inappropriate discussions in our out of class, **please talk to each other.**

Cell phones, pagers, etc: GRCC policy is that all cell phones and pagers must be turned off during class. Your teacher recognizes that emergencies do happen. If you feel you need to answer your cell phone during class, please leave the room quietly and take the call outside. You do not need to ask permission, just try not to disturb your fellow students. Exception: During an exam or quiz you will FAIL if the instructor sees your cell phone.

Computers: The computers in the classroom are to be used only for academic purposes. Students may use them to check schedules or register for classes *only during class breaks*. While class is in session they should be used only for physics (absolutely no games!). Violation of this policy will result in expulsion from the class for three days.

Cheating: Cheating (such as collaborating on quizzes or exams) can cause a wide range of disciplinary actions. If you are caught cheating on any quiz or exam, ***you should expect to fail the course!*** Further discipline can range from academic probation or expulsion from GRCC. Many of students cheat and most of them do not get caught. However, those that do are in universal agreement: cheating is not worth the risk.

Please keep in mind that you are in college to learn, and if you are cheating you ultimately only cheat yourself out of learning and skills that you would otherwise get from this class. You don't need to cheat to pass the class. Don't do it.

SYLLABUS QUIZ (Due Thursday)

NAME: _____ (please print)
PHYSICS 201 Section: _____

Instructions: Read the syllabus, answer the questions below, and sign the form at the bottom indicating that you have read the syllabus. Return this to the teacher on Thursday.

When are Keith's office hours? Where is his office? On his office door is a cover of "the Physics Teacher" with a picture of what ordinary household item?

What is the minimum that will happen to students caught collaborating on a quiz?

What will happen to students who are caught collaborating on homework?

Of the graded assignments of Physics 201 (other than quizzes and exams), for which assignment(s) are you...

required to work together?

allowed (but not required) to work together with **identical assignments accepted**?

allowed only to plan and consult together with **no identical assignments accepted**?

What is the name and room number of the room in the SC building where additional physics textbooks can be found and used by the students?

When is the deadline for applying for a Pass/Fail grade? (Check the quarterly schedule.)

Would a grade of "Pass" help you toward your career goals? (Okay, you don't need to answer this here, but you should know the answer for purposes of your own educational planning. A grade of "Pass" will not allow you to advance to the next physics class, nor will it be accepted by many schools of science or engineering.)

I have read the syllabus for Physics 201.

Signed,

(Signature of student)

(Date)
