

**PROPOSED**  
**GENERAL PHYSICS I**

**SYLLABUS GUIDELINES / COURSE INFORMATION**

CRN	00000
Course #	PHYS 2300      Section 01
Credits	4 Credits . 5 hours
Type	Undergraduate Day School
Description	This first-semester general college physics course consists of studies in the principle and application of classical mechanics, waves, sound and heat. Typical topics include description of motions, Newton's laws of motion, Kepler's law of planetary motion, universal gravitation, work and energy, conservation laws, temperature, heat, and laws of thermodynamics.
Cluster	LAB (Lab Science) Q (Quantitative Scientific Cluster) SMT (Science, Math and Technology)
Prerequisites	MATH 1300 or equivalent
Offered	Summer 2020 (June 29 – July 31, 2020)
Days	Lecture: MTW (Monday, Tuesday, Wednesday)      Lab: R (Thursday)
Hours	Lecture: 8:00 am – 10:00 am      Lab: 8:00 am – 10:00 am
Program	AUIA International Summer School
Location	Shanghai University of Finance and Economics, China
Office hours	After the class and by appointment
Professor	Dr. Hiremath
E-mail	chiremat(at)fitchburgstate.edu
Blackboard	SU20_00000_PHYS2300E-500: SU20_General Physics I-500

**TEXT**

College Physics. Revision CP-2012-005(03/15)-RS. OpenStax, 2017.

The e-textbook is free and can be downloaded via the website:

<http://openstaxcollege.org/textbooks/college-physics>

The print version is available at very low cost. All chapters 1-34

ISBN: 978-1-938168-00-0

**CLICKERS**

Website: <https://www.turningtechnologies.com/clickers/>

Device: ResponseCard LCD (Required)

Session ID: phys2300

**PROBLEM-SOLVING**

Hiremath, C. N.. "Let Your Success be BIIG: A New Paradigm for Problem-Solving in Science."

*International Journal of Physics* 3.3 (2019): 113-119.

**MOTTO**

Dr. Hiremath's  
**Physics** : **Honesty +Attitude Vigorous Enthusiasm = +A fun**

### OUTLINE

Week	Date	Topics	Lab	Exams
1	Jun 29	Syllabus & BIIG problem-solving strategy (Guidelines: Lab reports & Presentation)		
	Jun 30	Ch 1: The Nature of Science and Physics		
	Jul 1	Ch 2: Kinematics		
	Jul 2	(Measurements)	Lab	
	Jul 3 *	Ch 3: Two-Dimensional Kinematics	<b>2-Choices</b>	Quiz 1
2	Jul 6	Ch 4: Dynamics - Force & Newton's Laws of Motion <sup>T</sup>		
	Jul 7	(Motion)	eLab	Quiz 2!
	Jul 8	(Ch: 1, 2, 3)		<b>Exam 1</b>
	Jul 9	(Projectile)	eLab	
	Jul 10	Ch 5: Further Applications of Newton's Laws		
3	Jul 13	Ch 6: Uniform Circular Motion & Gravitation		
	Jul 14	Ch 7: Work, Energy, & Energy Resources <sup>T</sup>		
	Jul 15	Ch 8: Linear Momentum and Collisions		Quiz 3!
	Jul 16	(Springs)	Lab	
	Jul 17	(Ch: 4, 5, 6)		<b>Exam 2</b>
4	Jul 20	Ch 9: Statics and Torque		
	Jul 21	Ch 10: Rotational Motion & Angular Momentum		
	Jul 22	Ch 11-12: Fluids		
	Jul 23	(Rotation   Pendulum)	eLab   Lab	Quiz 4!
	Jul 24	(Ch: 7, 8, 9, 10)		<b>Exam 3</b>
5	Jul 27		<b>Presentations</b>	
	Jul 28	Ch 13: Temperature, Kinetic Theory, & the Gas Laws		
	Jul 29	Ch 14-15: Heat & Thermodynamics		
	Jul 30	Ch 16: Oscillatory Motion & Waves		
	Jul 31	<i>Exam (2 hrs)</i> (Ch: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16)		<b>Final</b>

### TEACHING PROCEDURES

The teaching procedures include one or more of the following:

Lecture with Document Camera/PowerPoint presentation, Clickers, White Board, student presentations, and demonstration.

### OBJECTIVES

- To understand the fundamental concepts and principles in physics through discussions and problem solving.
- To perform hands-on experiments in the laboratory, collect data, and analyze the results.

### GRADING

Quizzes/Homework <sup>+</sup>	10 %
Labs/Presentation <sup>+</sup>	25 %
Class	5 %
Exams <sup>+</sup>	30 %
Final Exam - Comprehensive	30 %
Total	100 %

- \* The professor reserves the right to change the grading scheme at any time.
- \* Mid-term grade is based on a maximum of 65 points <sup>+</sup>.
- \* For evaluation, Dr. Hiremath's BIIG problem solving strategy will be used.
- \* The Fitchburg State University grading scale will be followed.

95 – 100 = 4.0 A	86 – 88 = 3.3 B+	74 – 76 = 2.3 C+	64 – 66 = 1.3 D+	
92 – 94 = 3.7 A-	83 – 85 = 3.0 B	71 – 73 = 2.0 C	60 – 63 = 1.0 D	0 – 59 = 0.0 F
89 – 91 = 3.5 A-/B+	80 – 82 = 2.7 B-	69 – 70 = 1.7 C-		
	77 – 79 = 2.5 B-/C+	67 – 68 = 1.5 C-/D+		

### LEARNING OUTCOME

Upon completing this course with a grade of C or better, the student will be able to:

- Determine the appropriate number of significant figures in calculations;
- Calculate displacement, final velocity, and final position of an accelerating object;
- Apply problem-solving steps and strategy to solve problems;
- Identify and explain the properties of a projectile;
- Understand and apply Newton's three laws of motion;
- Explain Hooke's Law;
- Establish the expression for centripetal acceleration;
- Explain Earth's gravitational force;
- Define and calculate kinetic and potential energies;
- Explain the law of the conservation of energy;
- Describe the principle of conservation of momentum;
- Describe stable and unstable equilibriums;
- Express the ideal gas law in terms of molecular mass and velocity;
- Define heat as transfer of energy.

### ATTENDANCE

Attendance to the class/lab is required, that means it is counted towards your grade. The students must be present during the entire period. Late arrival and leaving early will also result in point deductions. Students missing more than 15% of scheduled classes may be withdrawn at the professor's discretion.

### CLASSES

It is important to have a non-disruptive class/lab. Hence, **all unauthorized electronic devices must be disabled and not visible at all times**. No music/video/phone calls/text messages should be heard/watched/read/made/sent in the class/lab. **This zero tolerance policy will be strictly enforced**. 5% of your grade (class) is assigned toward your attendance/engagement/listening/following rules/preparation. Students not behaving appropriately will be subjected to instant deduction of up to 5 whole points at the professor's discretion (refer to policy #23). Students are urged to participate in the discussion. Let us all make it a fun experience.

### HOMEWORK

After every class, homework will be assigned. However, it will not be graded. It is in your best interest that you complete it promptly. The exams/quizzes will include questions from the homework.

### QUIZZES

The quizzes will be short, about 30 minutes. It is based on the topics covered in the last lecture/chapter.

### EXAMS

There will be three 60 minute exams. Each exam will cover material since the previous exam. Exams are weighted twice.

The final exam will be of two hour duration. It will be comprehensive, and it will cover all course material. The final exam must be taken to receive a passing grade in the course.

### LABORATORY

For your safety as well as others, it is very important to follow the rules and directions. Hence, **no late arrivals** will be permitted. The **individual** lab report is due the following Tuesday at 11:59 pm (required), it must be submitted on the Blackboard (no email), and a complete hard copy with original non-scanned data must also be turned-in on Thursday by 7:59 am. No Blackboard upload, no hard copy! You may upload up to three times; only the latest version will be graded. It is important to meet the deadline. **A passing grade for the labs is required to pass this course.** At least one independent data set must be collected by every student. The presentations are considered as “Labs”.

### TARDINESS

All deadlines must be strictly followed. The failure to turn in work by the due date would receive a zero. For prior notification or emergency, in rare situations two points will be deducted for late submission.

### PLAGIARISM

Students at Fitchburg State are expected to be honest and forthright in their academic endeavors. Cheating of any kind will not be tolerated. If caught, you will receive a grade of F for the course, and will be subjected to additional discipline from the university.

### EQUIPMENT

A scientific/engineering calculator is strongly recommended. All other calculators are not allowed including phone/PDA.

### DISABILITY

Disability Services are available to student at Fitchburg State University. If you require accommodations for this class, please contact Disability Services as soon as possible.

### FIRE POLICY

When a fire alarm sounds in the building, all occupants must exit the building. Please do not use the elevator. Reentry in the building is permitted only after proper authorization is received and communicated by Campus Police or public safety official.

### DISCIPLINARY OFFENCES

A student who violates the Student Code of Conduct shall be subject to disciplinary action, as stated in University Policies:

[http://catalog.fitchburgstate.edu/content.php?catoid=12&navoid=788#Academic\\_Integrity\\_Policy](http://catalog.fitchburgstate.edu/content.php?catoid=12&navoid=788#Academic_Integrity_Policy)

## POLICIES

1. All classes/labs/quizzes/exams will start on-time. Late arrivals will not be given extra time.
2. No food or drink is allowed in the class or the laboratory.
3. Phones, computers, PDAs, iPods, and other electronic devices must be turned off and **not visible at all times in the class/lab**.  
**Students may be asked to leave their phones in a common designated area.**
4. The professor reserves the right to make changes to this syllabus at any time as necessary.
5. The Fitchburg State University grading scale and Dr. Hiremath's BIIG problem solving strategy will be followed for evaluation.
6. Each student is responsible for completing all course requirements and for keeping up with all activities of the course (whether a student is present or not).
7. Attendance is required for the class and lab portion of the class. The lab is an integral part of the course.
8. All exams/quizzes including the final exam are "**closed book**".
9. A passing grade in the labs is mandatory to pass the course. The lowest score from the **submitted** lab reports may be dropped.
10. Homework will not be graded separately. However, the quizzes and exams will be based on the homework too.
11. Cheating of any kind will not be tolerated. If caught, you will receive a grade of F for the course, and will be subjected to additional discipline from the university. The student(s) must cooperate during investigation.
12. Acting in a manner that interferes with or disrupts the normal and/or safe operation of the class, including but not limited to disrupting or interfering in the educational process will result in expulsion from the class with an immediate call to the security officer, if necessary.
13. Only printed course related material will be made available. Copies of the slides will not be given to the students.
14. Course related material should not be photocopied/scanned and/or distributed to anyone.
15. Students are encouraged to discuss the topics. In the labs, students will be paired up, at least one data set must be collected independently, and each student should individually perform the analysis and reports.
16. All email communication will be through the Fitchburg State University accounts. The best learning experience is possible when both the students and the teacher provide prompt feedback.
17. Please remember every minute counts toward the learning and grades. A positive attitude takes you a long way. Students not behaving appropriately will be subjected to an instant deduction of up to 5 points at the professor's discretion.
18. In a real world, one person's actions can affect others. In some cases, entire class might lose certain privileges, such as lecture summary, lecture quiz, additional lecture problems, handouts, hints, etc.
19. Students are expected to master the concepts taught in the class promptly, before coming to the next class. This will make the learning of the new concepts easier.
20. All students are expected to come to class prepared and on time, and remain for the full class period/until the end.
21. Student's work might be displayed in the classroom to help students reflect on their work. The data collected from the surveys, feedbacks, reports, discussions, etc. may be used for research purposes only.
22. Classroom discussion should be civilized and respectful to everyone.
23. Depending on the general performance, scaling may be applied at the very end, which could "boost" the grade slightly for everyone. This "extra credit" is contingent upon the individual student's positive behavior and is entirely at the discretion of the professor. Offenses include, but not limited to, being disruptive, disrespectful, using unauthorized electronic devices, talking to other classmates during the class, etc. All offenses, except the first offense, will be discretely recorded. First offense is a warning. Second offense is 1 point deduction from the overall score. Third offense is 2 points deduction from the overall score. **More than three offenses is 2 points deduction AND will also result in a "flag" for which the consequence is losing the privilege of the scaling benefit.** Apologies cannot undo the past.
24. Rewards include an honorable mention in the class and/or nomination for "Student of the Month Award".
25. Physics is a challenging subject; even if you are a great student in other subjects, **physics should not be simply taken for granted**.
26. No makeup of anything related to the course is possible. **There are absolutely no special projects to improve your grade.**
27. All deadlines are firm. No exceptions.
28. The overall grade is final. The grades will not be notified by email.
29. **There will be absolutely no revisiting of grades after they have been assigned.**

## EXPECTATIONS

**Think BIIG!**

- B - Buddies  
Number(s) and unit(s)  
60 m/s
- I - Identification  
What they represent  
 $v = 60 \text{ m/s}$
- I - Isolation  
Contextual information  
 $v_{car} = 60 \text{ m/s}$
- G - Gourmet  
Finishing touches  
The velocity of the car,  $v_{car}$ , is 60 m/s.

**Example**Reference:

$$s = \Delta x / \Delta t \quad ; \quad 1 \text{ mi} = 1609 \text{ m}$$

Problem:

Suppose the distance between Boston and New York City is 202 miles and you are driving at 50 miles per hour. How long will it take to reach the destination? Will you reach within 3 hours?

**Not acceptable!**• Solution:

We have,

$$d = 202 \text{ mi} \quad s = 50 \text{ mi/h}$$

Using the equation,

$$\begin{aligned} \Delta t &= \Delta x / s \\ &= (202 \text{ mi}) / (50 \text{ mi/h}) \quad \text{or} \\ &= (202) / (50) \quad \text{(calculator view!)} \\ &= 4.04 \end{aligned}$$

you will not reach the destination within that time.

**Recommended!**• Solution:

We have,

$$\begin{aligned} \Delta x &= 202 \times 1609 \text{ m} & s &= 50 \times 1609 \text{ m/h} & 1 \text{ mi} &= 1609 \text{ m} \\ \Delta t &= ? \text{ (h)} & \Delta t &< 3 \text{ h?} \end{aligned}$$

Using the speed equation and solving for time interval,

$$\begin{aligned} \Delta t &= \Delta x / s \\ &= (202 \times 1609 \text{ m}) / (50 \times 1609 \text{ m/h}) \quad \text{or} \\ &= (202 \times 1609) / (50 \times 1609) \quad \text{(calculator view!)} \\ &= 4.04 \text{ h} \end{aligned}$$

The time taken to reach the destination is:  $4 \text{ h}$   
Since, the time taken is more than 3 h,  
you will not reach the destination within that time.