PHYS-2211

PRINCIPLES OF PHYSICS I

Mechanics, Thermodynamics and Waves

University and Instructor Information

Institution: Georgia State University | Perimeter College

Department of Physical Sciences, Clarkston Campus

Instructor: Martin Okafor

Associate Professor of Physics

Website: http://sites.pc.gsu.edu/mokafor/

Office: C Bldg. 2162
(phone: 678-891-3759, department office: 678-891-3750)

Email address: mokafor@gsu.edu

Textbook:


Prerequisites: MATH 2431 with a C or better.

Requisite

PHYS 2211 Lab (1 credit)

Other Materials

Scientific calculator, portable computer or other personal digital learning mobile device, etc.

Students may use their personal smart phones to review available online course materials.

Course Description

An introductory course that will include mechanics (kinematics, dynamics, work and energy, momentum and collisions, and rotational motion and statics), and may also include mechanical waves and thermodynamics. Elementary calculus will be used. A separate laboratory is required.
*This course syllabus provides a general plan for the course, deviations may be necessary.

General Course Purpose

The purpose of this course is to provide students the fundamentals of the principles of mechanics, simple harmonic oscillations, mechanical waves, and may also include thermodynamics.

Tutoring & Advisement

<table>
<thead>
<tr>
<th>Periods</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periods</td>
<td>10:00 am - 12:00 pm; 04:00 pm - 05:00 pm</td>
<td>10:00 am - 12:00 pm; 04:00 pm - 05:00 pm</td>
<td>04:00 pm - 05:00 pm</td>
<td>04:00 pm - 05:00 pm</td>
<td>*By appointment</td>
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Course Assessments

Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take time to fill out the online course evaluation.

Course Requirements

This course requires the use of a computer and the Internet. You are responsible for completing any online and text-based course assignments. The course materials are accessible online by logging on to iCollege and the other course learning tools, including WebAssign and FlipitPhysics.

Your iCollege username and student identification number are required for online access. On the first day of class, log on to iCollege and review the course information on the course homepage.

Class attendance and participation are required for this class. Participation is measured by your physical presence in class discussions, and your online responses to any assignments, quizzes, required class discussions, or any other required class activity. Absence does not excuse the student from the responsibility of participation. Students are expected to participate in all online, in-class and out-of-class activities that may include collaborative learning sessions. In-class sessions and any Web-based activities, assignment submissions and brief presentations are considered as important aspects of participation in this course.

Assignments: In order to encourage and positively reinforce student accomplishment, miscellaneous assignments based on take-home work, quizzes, and class exercises will be given and scores are recorded on the iCollege course section. Assignments may be posted online or given in class. Therefore, check the iCollege course website frequently and respond appropriately when necessary. If you experience any technical difficulties with your access and participation, please contact the instructor immediately.

Examinations: The material for the Tests and Final exam will be drawn from the in-class and online homework assignments, class exercises, text readings, solved examples and prior tests. Rote memorization of solutions to problems will not be sufficient for a student to pass this course!
Students may be required to use one RED scantron sheet (to be provided by instructor) during any proctored test or examination.

Course Components

The Course Tools for Learning are well-selected and organized to augment the course material and thereby encourage the student to succeed as an active learner. The five Tools for Learning in this course include:

1. course materials, including study guides and assessments, posted on iCollege;
2. online assignments, including iCollege Quizzes, WebAssign and FlippiPhysics assignments;
3. online post-lecture challenge assignments;

(1) GSU-PC iCollege (http://icollege.gsu.edu) learning management system. Course materials, including study guides, practice problems with solutions, online quizzes, and other forms of assessments will be posted on iCollege.

(2) Online homework assignments that are well-selected to promote higher levels of critical-thinking and quantitative problem-solving skills, in addition to strong conceptual background. These assignments include: (a) online Pre-lecture explorations and exercises (including simulations and narrated video lessons), and (b) Study Guide/Tutorials.

(3) Challenge assignments that are designed to provide opportunities to promote mastery and deep learning. These assignments should hone critical-thinking skills of the students in applying newly acquired knowledge to solve unfamiliar problems and analyze observed physical phenomena. These challenge assignments are designed to challenge students appropriately and present “desirable difficulties” that require considerable effort commensurate with level of the course.

(4) CyberPhysicsLinX Project. Students will be required to prepare and submit a project report that demonstrates an appropriate level of transfer of learning in relating theoretical concepts and physical principles to explain their real-world observations.

Course Learning Objectives

Minimum General Learning Objectives for the Introductory Physics Courses:

The objective of this physics course sequence is for the student to learn and be proficient in the application of the basic laws of physics. After taking one or both of these courses, the student should be able to:

1. Interpret physical situations as stated in a word problem;
2. identify the physical laws appropriate to the physical situation at hand;
3. Use mathematics/physical law as a tool for prediction of behavior of representative physical systems;
4. Represent physical systems in multiple representations of physical systems mathematically, pictorially, graphically, and/or in written descriptions, etc.
5. Translate multiple representations, i.e. written, pictorial, graphical and/or data descriptions, of a physical system into an appropriate mathematical model;
6. Use various types of data collection tools for the experimental investigation of physical laws;
7. Write a formal laboratory report appropriate for the level of the introductory physics laboratories.
EXPECTED EDUCATIONAL RESULTS.
At the completion of this PHYS 2211 course, the student should be able to do the following:

Mechanics (specific objectives for core topics):
- Apply equations of kinematics in order to describe non-accelerated and uniformly accelerated motion;
- Apply Newton’s laws of motion to analyze and solve numerical problems in cases where:
  - A single or multiple set of forces acts on a single object both in equilibrium and not in equilibrium;
  - There exist forces of kinematic friction and/or static friction that act on an object or system of linked objects;
- Frictional forces and the force of gravity affect the motion of an object or a system of objects;
- Apply the work-energy theorem to account for conservative and non-conservative forces that act on a system in relation to the kinetic energy, potential energy and the work done by non-conservative forces;
- Apply conservation of linear momentum and energy to account for changing motions in the form of Newton's Second Law, elastic and inelastic collisions and rotational motion, and statics as appropriate;
- Apply the concepts of torque, moments of inertia, conservation of energy and angular momentum to account for the rotational motion of an object;
- Apply graphical and mathematical representations of simple harmonic oscillatory motion and energy to account for the dynamics of oscillating systems.

Waves and Sound (specific objectives for core topics):
- Discuss wave motion and characterize wave motion by the amplitude and frequency;
- Recognize and be able to apply the equation for a one dimensional harmonic traveling wave to determine the direction of a traveling harmonic wave;
- Apply the principle of superposition to combine two harmonic waves and predict the nature of standing waves on a string and in an air column;
- Determine the energy intensity at some distance from a sound source;
- Employ the equation for the Doppler Effect to predict observed frequency and wavelength shifts;
- Use the principle of superposition to predict the nature of standing waves on a string and in an air column.

**Thermodynamics (specific objectives for core topics):**
- Relate the Zeroth Law of Thermodynamics to calibration of thermometers; convert between temperature scales;
- Solve problems that involve the thermal expansion coefficients of solids and liquids.
- Employ the equations that apply to specific heat capacity, latent heat, and the law of conservation of energy to solve calorimetry problems;
- State the First Law of Thermodynamics and apply this law to solve problems in thermodynamic processes;
- Apply the equations that relate to heat transfer by conduction, convection, and radiation to solve relevant problems that may involve realistic examples of heat transfer mechanisms between a system and its surroundings;
- State the Second Law of Thermodynamics and apply the First and Second Laws to analyze thermodynamic processes and problems related to the thermal efficiency of heat engines, concept of entropy, and performance of refrigerators.

**Coverage may be limited due to time constraints**
# SYLLABUS – PHYS-2211 Tentative Lecture Schedule

**Course:** PHYS-2211-009 (85484) (T/R)  
**Academic term:** Fall Semester 2019  
**Location:** GSU PC Clarkston - Meets on T/R, 2:30 p.m. - 3:45 p.m.; Rm CC-1220

<table>
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<tr>
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<tbody>
<tr>
<td><strong>COURSE CONTENT</strong></td>
<td></td>
</tr>
<tr>
<td>Chapter 1: Getting Started</td>
<td>(T) 8/27</td>
</tr>
<tr>
<td>Chapter 2: One-Dimensional Motion.</td>
<td>(R) 8/29; (T) 9/3</td>
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<tr>
<td>Chapter 3: Vectors</td>
<td>(R) 9/5</td>
</tr>
<tr>
<td>Chapter 4: Two- and Three-Dimensional Motion</td>
<td>(T) 9/10; (R) 9/12</td>
</tr>
<tr>
<td>Chapter 5: Newton's Laws of Motion</td>
<td>(T) 9/17</td>
</tr>
<tr>
<td><strong>TEST ONE (Ch. 1, 2, 3)</strong></td>
<td>9/19/2019</td>
</tr>
<tr>
<td>Chapter 6: Applications of Newton's Laws of Motion</td>
<td>(T) 9/24; (R) 9/26</td>
</tr>
<tr>
<td>Chapter 8: Conservation of Energy</td>
<td>(T) 10/1; (R) 10/3</td>
</tr>
<tr>
<td>Chapter 9: Energy in Non-isolated Systems</td>
<td>(R) 10/3; (T) 10/8;</td>
</tr>
<tr>
<td><strong>TEST TWO (Ch. 4, 5, 6)</strong></td>
<td>10/10/2019</td>
</tr>
<tr>
<td>Chapter 10: Systems of Particles and Conservation of Momentum</td>
<td>(T) 10/15; (R) 10/17</td>
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<tr>
<td>Chapter 11: Collisions</td>
<td>(T) 10/22;</td>
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<tr>
<td>Chapter 12: Rotation I: Kinematics and Dynamics</td>
<td>(R) 10/24;</td>
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<tr>
<td>Chapter 13: Rotation II: A Conservation Approach</td>
<td>(T) 10/29; (R) 10/31;</td>
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<tr>
<td>Chapter 14: Static Equilibrium, Elasticity, and Fracture</td>
<td>(T) 11/5; (T) 11/12;</td>
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<tr>
<td><strong>TEST THREE (Ch. 8, 9, 10, 11)</strong></td>
<td>11/07/2019</td>
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<tr>
<td>Chapter 15: Fluids</td>
<td>(R) 11/19;</td>
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<tr>
<td>Chapter 16: Oscillations</td>
<td>(R) 11/19; (T) 11/21;</td>
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<tr>
<td>Chapter 17: Traveling Waves</td>
<td>(T) 12/3;</td>
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<tr>
<td>Chapter 18: Superposition and Standing Waves</td>
<td>(T) 12/5;</td>
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<tr>
<td>+ Chapter 19: Temperature, Thermal Expansion, and Gas Laws</td>
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<td>+ Chapter 20: Kinetic Theory of Gases</td>
<td></td>
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<td>+ Chapter 21: Heat and First Law of Thermodynamics</td>
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<tr>
<td>+ Chapter 22: Entropy and the Second Law of Thermodynamics</td>
<td></td>
</tr>
<tr>
<td><strong>COMPREHENSIVE FINAL EXAMS:</strong></td>
<td>Thursday, Dec. 12, 2019; 2:30 p.m. - 5:00 p.m.</td>
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</table>

* Selected Sections covered; + May be omitted due to time constraints; ** Comprehensive Final Examination
Course Grading:

Overall course percent scores and course grades for the PHYS-2211 (lecture) course will be determined, based on the following criteria:

Grading Criteria:

The final course grade for PHYS-2211 is based on the weighted percent sum of all the scores from the course components, as follows:

<table>
<thead>
<tr>
<th>Course Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Three Periodic Tests</td>
<td>40%</td>
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<tr>
<td>Assignments</td>
<td>35%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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</table>

**Total = 100%**

Extra Credits

**Student Course Portfolio:** All students must maintain an up-to-date Student Course Portfolio (in electronic or print notebook format). Every student should periodically review his/her course portfolio as a tool for self-assessment and self-reflection on the course progression in order to enhance their learning experience and for pre-examination reviews.

- For submitting their own qualifying Student Course Portfolio on completion of the course requirements, a student can earn up to additional 20 extra-credit points that will be added to the sum of the three Periodic Test scores. * Please review the grading rubric for the course portfolio.

**Extra-Credit Challenge Assignments:** Students will also have opportunities to earn extra-credit points for correctly solving specific higher-order challenge assignments, which are directly linked to their practice activity worksheets and examination preview questions, in order to foster those higher-order thinking skills that emphasize integration, synthesis, and transfer of knowledge.

**Final Grades:**

Final Grades based on the overall computed score for this course will be assigned using the following university-approved standard:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90% - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80% - 89%</td>
</tr>
<tr>
<td>C</td>
<td>70% - 79%</td>
</tr>
<tr>
<td>D</td>
<td>60% - 69%</td>
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<tr>
<td>F</td>
<td>Less than 60%</td>
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</tbody>
</table>
Semester Course Calendar

Tentative General Course Schedule:

<table>
<thead>
<tr>
<th>Dates to Remember!</th>
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<tbody>
<tr>
<td>August 26, 2019</td>
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<tr>
<td>September 2, 2019</td>
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<td>October 15, 2019</td>
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<tr>
<td>November 25 – 30, 2019</td>
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<td>December 9, 2019</td>
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<td>December 10 – 17, 2019</td>
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*TEST DATES

<table>
<thead>
<tr>
<th>Test</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Test One</td>
<td>Thu. 09/19/2019</td>
</tr>
<tr>
<td>Test Two</td>
<td>Thu. 10/10/2019</td>
</tr>
<tr>
<td>Test Three</td>
<td>Thu. 11/07/2019</td>
</tr>
<tr>
<td>Final Exam: PHYS-2211-009</td>
<td>Thursday, Dec. 12, 2019; Time: 2:30 p.m. - 5:00 p.m.</td>
</tr>
</tbody>
</table>

*ALL TESTS ARE PROCTORED ON CAMPUS BY AN INSTRUCTOR. (*The Instructor may change Test/Exam dates, if and when necessary).  

Instructional Delivery Strategy

The PhysicsLinX course model is based on a “Blended/Flipped Classroom” model. This instructional strategy: (i) exposes learners to course material prior to class reviews, (ii) actively engages these learners in class, and (iii) sustains the engagement of learners with challenging out-of-class assignments.

Modules of instructional support materials, including PowerPoint lecture presentation slides, pre-lecture video links, class activities and notes, will be available on the iCollege course website. Specifically, students are required to complete online (FlippedPhysics) pre-lecture assignments before lecture sessions. Online (WebAssign) assignments are assigned as post-lecture homework that are completed during or after lectures on the topics. During lecture sessions, students may sometimes engage and collaborate in small peer groups to “tackle homework” problems. Students are required to preview online instructional materials (e.g. lecture slide presentations and computer-based simulations, videos, study guides, e-book, etc.) at their own pace outside the lecture sessions, but engage in interactive activities during lectures.

Therefore, it is very important that students come to lecture discussions fully prepared for every class session!
**Weekly Tutorial Sessions.**

Every student should endeavor to participate in weekly review/tutorial sessions facilitated by the course instructor. Students will have opportunities for one-on-one assistance with the instructor during these sessions, if more help is needed with the course material.

**Test Corrections Strategy:**

"Test Corrections" is designed as an incentive for learning that offers every student an opportunity to improve their score on each class test by "earning back" some percentage of the missed points on a test. Through a process of critically reviewing and self-correcting graded test scripts, the student should be able to identify any gaps in their knowledge and improve their self-monitoring skills of his/her level of understanding of the topics covered. All students should purposefully consider Test Corrections as an important tool for learning that focuses simultaneously on the process of learning, integrating self-assessment and self-reflection to improve learning.

**Student Course Portfolio.**

All students must maintain an up-to-date Student Course Portfolio in digital or print notebook format. However, submitting the course portfolio for extra-credit consideration is optional. This portfolio will be a repository of all the tests, graded and ungraded homework assignments (including copies of submissions) for the course. Your portfolio could be an online digital folder or a physical notebook folder. A qualifying course portfolio must meet most of the requirements specified in the course portfolio guidelines, as provided elsewhere (on iCollege).

The student's course materials in the best course portfolio should reflect original work and be properly organized. The best portfolio should indicate a student's strong cognitive engagement with physics concepts and demonstrate excellent problem-solving skills by the student. Specifically, such portfolio should indicate how the student effectively applied appropriate physics concepts, principles, laws, and theories to specific problem-solving assignments.

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**Georgia State University - Perimeter College Policies**

**ATTENDANCE AND PARTICIPATION POLICY:**
A student is responsible for all announcements made in the course. Absence from class discussions and activities does not relieve you of this responsibility.

**NO SHOW:** If you do not attend class on campus within the first 1-2 weeks, you will be reported during the "ROLL/ATTENDANCE Verification" period for non-attendance or as a "No Show". Once you are reported as "NEVER ATTENDED/PARTICIPATED" or "STOPPED ATTENDING/PARTICIPATING", a course grade of "PW", "WF", or "W" may be entered on your record for the course.

**ASSIGNMENTS** will be posted online. Therefore, check the iCollege course website frequently and respond appropriately when necessary. If you experience any technical difficulties with your online access and participation, please contact the instructor immediately.

**PARTICIPATION GUIDELINES:** Do not post any online comments that will not be appropriate in the traditional classroom. Every online posting by a student must be just as relevant as if in the face-to-face (f2f) traditional classroom setting. Observe good NETIQUETTE (Internet Etiquette) for all online communication. Avoid the use of capitalized words unless used to emphasize a point, or for a title. Capitalizing is generally viewed as "shouting" at someone. Be mindful of your audience when using humor. The lack of f-2-f visual cues in online communication may result in the misinterpretation of a humorous comment as "flaming" (angry or antagonistic...
criticism). Be professional, courteous, and careful with your online interaction. Remember every comment is recorded!

The instructor can deny any student online access to the course if that student consistently or blatantly disregards these guidelines for online participation. If denied online access, all subsequent interaction will be either through other web access (such as private email) or in print (e.g. US mail).

This course will be topics-driven and course guidelines that are designed to direct your learning and pace the course may be posted online. Just a reminder…you must log on and participate.

**WITHDRAWAL POLICY:**

In the belief that college students are mature adults and are responsible for their learning, the number of absences will not be applied in computing the final grade the student earns. If a student finds it necessary to stop coming to class, the student should take time to initiate the withdrawal from class. Please refer to the university webpage on Withdrawals "http://registrar.gsu.edu/registration/withdrawals/" :

"You must complete the procedure to withdraw from a class using PAWS.

A withdrawal before the semester midpoint does not guarantee a grade of W. "A student has the right to withdraw from a lecture and not the co-requisite lab. A student also has the right to stay enrolled in lecture but withdraw from the co-requisite lab. A student who wants to withdraw from both lecture and lab must submit withdrawal forms for both courses in GoSolar/PAWS. There will be NO automatic withdrawal from co-requisite courses. It is the student's responsibility to withdraw from all relevant courses if a student desires to do so. Please refer to the following Syllabus policy:

Syllabus Policy: 2019-2020 Perimeter College Course Catalog

https://catalog.gsu.edu/associate20192020/university-academic-regulations/#revision-of-class-schedules-add-drop-withdraw

**Assignment Submissions, Missed Work, and Instructor Feedback on Weekends:**

Assessments may be given during regular class periods. Quizzes and other miscellaneous assignments may be given online. No exam make-ups will be given except in extenuating circumstances as may be determined by the Instructor. Students must read and complete the assignments within the time allowed for each activity in order to earn any points. Assigned written homework will be collected for grading. Students may submit copies of clearly legible, written assignments to the instructor as e-mail attachments in MS Word ".doc" or ".rtf" or the Adobe ".pdf" formats. The instructor must pre-approve any other document formats.

**LATE ASSIGNMENT SUBMISSION:**

All submitted assignments that are not date-stamped in iCollege by the specified due dates for the assignment will be considered as being "late". The penalty for the late submission of any assignment will be a reduction of the earned score by twenty percent (20%) of the maximum score for each assignment up to five days late after the due date of the assignment. All submissions more than FIVE days late without the instructor’s permission may not be graded. Students may only submit scanned assignments to the instructor via iCollege email with special permission. Penalty terms will be applied to late submissions.

**GETTING FEEDBACK FROM THE INSTRUCTOR**

The instructor continuously monitors this course progression, periodically. Therefore, please expect my response to any postings within 24 to 48-hour intervals during weekdays. For online inquiries submitted on weekends (Friday evenings through Sunday nights), please allow up to 72 hours before expecting any posted response to any posting. However, please feel free to ask any course-related question during any class activities.
ON-CAMPUS TEST/EXAM POLICY:
All on-campus TESTS and Final Examination will be proctored by an instructor. For the scheduled periodic TESTS and Final Exam, you may bring your pens, pencils, rulers, and calculators. All mobile communication devices (e.g. phones, personal digital assistants, laptops, etc.) will not be permitted for use in class exams. Writing paper and formulae will be provided. Please do not bring your children or pets to the campus for on-campus exams.

Physics Formulae:
Formulae will be provided during tests or final exam in an effort to ensure uniform and equitable access to certain formulae and data for all students. However, NO formulae will be provided for any other online homework or face-to-face class assignments or other activities!

Test/Exam Make-up Policy:
It is the responsibility of each student to contact the instructor in case of any emergency that hinders the student’s class participation and completion of any assignments within the specified time. There will be no make-up for any tests and examinations, except in extenuating circumstances as may be determined by the instructor or unless prior arrangements have been made with the instructor.

GEORGIA STATE UNIVERSITY – PERIMETER COLLEGE (GSU-PC) POLICIES

POLICY ON ACADEMIC HONESTY:
GSU's Academic Honesty Policy can be found at the following link:
http://deanofstudents.gsu.edu/faculty-staff-resources/academic-honesty/
The pdf version of this GSU's Academic Honesty Policy can be found at the following link:

This Policy on Academic Honesty (Policy) provides examples and definitions intended to clarify the standards by which academic honesty and academically honorable conduct are to be judged. A non-exhaustive list provided in the Policy illustrates the kinds of infractions that may occur, such as Plagiarism, Cheating on Examinations (including tests and quizzes), Unauthorized Collaboration, Falsification, and Multiple Submissions. Details that clarify each of these infractions are provided in the Policy. Students are strongly encouraged to review and abide by this Policy on Academic Honesty.

Furthermore, any attempt made by a student to intentionally mislead an instructor in the determination of a grade will also be considered as cheating. Cheating includes any attempt to defraud, deceive, or mislead the instructor in arriving at an honest grade assessment. Cheating of any kind may result in a penalty ranging from a grade of zero for the work in question to a grade of F in the course.

CONDUCT DURING COURSE
The online or face-to-face classroom is meant to be a positive, academically stimulating environment that promotes student learning. Students are expected to conduct themselves with utmost self-respect and dignity. You are expected to be considerate of the rights of the other students so as not to disrupt their ability to learn or my ability to teach. This expectation applies to in-class use of cell phones and laptops, peer-to-peer side talk, participation in class discussions, and more. Students who engage in disruptive actions may be asked to leave the class or be excluded for cause.
During testing, NO communication between students is allowed without the expressed permission of the testing proctor or Instructor. Use of unauthorized formula sheets and/or notes during testing will be considered as cheating.

Unless specifically authorized by the instructor, the following are examples of cheating or plagiarism. This is not an exhaustive list.

**A. On any examination, test, or quiz:**
1. Looking at or copying from another student's work.
2. Allowing another student to look at or copy your work.
3. Exchanging information with another student.
4. Speaking or whispering. (You may speak to the instructor at any time)
5. Opening a textbook or notebook.
6. Looking at notes, on paper, using electronic devices (e.g. phones, PDA or similar devices) and other formats.

**B. On homework or other out-of-class assignments:**
1. Copying work or answers from another student.
2. Copying work or answers from a book.
3. Having another person do work for you.
4. Allowing another student to use your work as his or her own.

**C. For late work or tests:**
Providing false information or false documents in order to be allowed to make up a missed test, quiz, or homework.

**PREREQUISITE POLICY:**
Any student who does not meet the prerequisite(s) for this course is strongly advised to drop the course. Otherwise, the student may be administratively withdrawn with loss of tuition later. Any official waiver of prerequisites must be in writing.

**Disability Services**
Students who wish to request accommodation for a disability may do so by registering with the Office of Disability Services. Students may only be accommodated upon issuance by the Office of Disability Services of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which accommodations are sought.

**Learning and Tutoring Center**
The LTC offers FREE walk-in tutoring and academic support at FIVE Perimeter College campuses. The LTC provides a variety of other resources and services to accommodate student needs. All LTCs are equipped with computers, instructional software and internet access. Please visit the LTC’s website [https://success.students.gsu.edu/learning-tutoring-center/](https://success.students.gsu.edu/learning-tutoring-center/) to find information about locations, hours of operation, tutoring and workshop schedules, handouts, online tutoring and links to online practice resources.

**Contacts:**
- Alpharetta Campus: Dr. Lizann Gibson, lgbison@gsu.edu
- Clarkston Campus: Mary Hamilton, mhamilton@gsu.edu
- Decatur Campus: Sohayla Mohebbi, smohebbi@gsu.edu
- Dunwoody Campus: Nancy McDaniel, nmcdaniel@gsu.edu
- Newton Campus: Arne Paulsen, apaulsen@gsu.edu
"Incomplete" (I) Course Grade:
A grade of "Incomplete" or an "I" will only be given for documented emergencies that occur near the end of the semester. The student must be passing to receive an "I" grade and must fill out the proper form, specify the missed work, and attach any required documentation (such as a hospital record).

Inclement Weather:
If the College is closed due to inclement weather or other reasons, any scheduled tests, quizzes or examination during that period will be conducted during the next available full class period in the order of the initial schedule.

Tobacco and Smoke-Free Campus Policy
Tobacco and Smoke-Free Campus Policy: The University System of Georgia (USG) Board of Regents adopted a tobacco and smoke-free campus policy to make USG 100% tobacco free effective October 1, 2014. All faculty, staff, students, visitors, vendors, contractors, and all others are prohibited from using any tobacco products while on GSU property. “Tobacco Products” is defined as cigarettes, pipes, cigars, all forms of smokeless tobacco, clove cigarettes and other smoking devices that use tobacco such as hookahs or simulate the use of tobacco such as electronic cigarettes. Violations of the smoking policy will be handled under the Georgia State University Student Code of Conduct.

Disruptive Behavior Policy

Statement of Non-Discrimination
Georgia State University - Perimeter College supports the Civil Rights Act of 1964, Executive Order #11246, Title IX of the Educational Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act. No person shall, on the basis of age, race, religion, color, gender, sexual orientation, national origin or disability, be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any program or activity conducted by Georgia State University - Perimeter College.

Any individual with a grievance related to the enforcement of any of the above provisions should contact the Assistant Director of Human Resources, Ombudsperson

CAMPUS CARRY LAW
Campus Carry Law – Information from the University System of Georgia (USG) can be found at www.usg.edu/hb280 The Campus Carry legislation allows anyone properly licensed in the State of Georgia to carry a handgun in a concealed manner on university property with noted exceptions. Information about the law can be found at safety.gsu.edu/campus-carry. It is the responsibility of the license holder to know the law. Failure to do so may result in a misdemeanor charge and may violate the Georgia State University Student Code of Conduct."

EQUAL OPPORTUNITY STATEMENT
No person shall, on the grounds of race, color, sex, religion, creed, national origin, age, or disability, be excluded from employment or participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity conducted by Georgia State University - Perimeter College.

AFFIRMATIVE ACTION STATEMENT
Georgia State University - Perimeter College adheres to affirmative action policies to promote diversity and equal opportunity for all faculty and students.
General Education Outcomes

General Education Learning Goals for the Core Curriculum:

The learning outcomes for general education courses are available at: www.gsu.edu/~wwffhb/goals.doc as approved by the GSU Senate 2/13/2004.

**Goal I-- Communication:**
1. Students communicate effectively using appropriate writing conventions and formats.
2. Students communicate effectively using appropriate oral or signed conventions and formats.

**Goal II- Collaboration:**
1. Students participate effectively in collaborative activities.

**Goal III- Critical Thinking:**
1. Students formulate appropriate questions for research.
2. Students effectively collect appropriate evidence.
3. Students appropriately evaluate claims, arguments, evidence and hypotheses.
4. Students use the results of analysis to appropriately construct new arguments and formulate new questions.

**Goal IV- Contemporary Issues:**
1. Students effectively analyze contemporary issues within the context of diverse disciplinary perspectives.
2. Students effectively analyze contemporary multicultural, global, and international questions.

**Goal V - Quantitative Skills:**
1. Students effectively perform arithmetic operations, as well as reason and draw appropriate conclusions from numerical information.
2. Students effectively translate problem situations into symbolic representations and use those representations to solve problems.

**Goal VI - Technology:**
1. Students effectively use computers and other technology appropriate to the discipline.

Discipline-specific Learning Outcomes:

**Goal A1-- Communication Outcomes:**
1. Students have the ability to assimilate, analyze, and present in oral and written forms, a body of information;
2. Students have opportunities to improve their physics reading skills and writing skills through course activities, assignments, and problem solving activities;
3. Students have the ability to communicate scientific investigations and information clearly by writing clear coherent laboratory reports, using data as evidence to support conclusions.

**Learning Goal A2 -- Quantitative Outcomes:**
1. Quantitative reasoning and mathematics will be characterized by logic, critical evaluation, analysis, synthesis, generalization, modeling, and verbal, numeric, graphic, and symbolic problem solving;
2. Students develop individual and group problem-solving skills and critical thinking skills, quantitatively and qualitatively through a variety of course related activities.
Learning Goal D – Natural Sciences:

a. Scientific reasoning will be characterized by understanding and applying scientific method using scientific processing skills, emphasizing laboratory techniques, mathematical principles, and relating experimental design to natural phenomena.

b. Students have the ability to recognize and apply scientific inquiry using conceptual and physical models of phenomena, emphasizing the methods of data collection, doing experiments and relating the outcomes to the relevant theories and physical laws.

*** Review all Syllabus ADDENDA posted on iCollege

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