Instructor: Dr. David R. Fazzini

Office: BIC-3624B
Hours: Monday, Wednesday, and Friday: 10:00 AM – Noon
Tuesday: 1:00 PM – 3:00 PM
Monday and Thursday: 4:00 PM – 5:00 PM
(Other times by appointment.)

NOTE: During some of my office hours, I will be found in the Physics Lab Prep area (BIC-3622) or one of the adjoining labs (BIC-3736, -3738, or -3740).

Phone: 630-942-3349 E-mail: fazzinid@cod.edu
Mailbox: BIC-2616 FAX: 630-942-2759

Course Description:
Conceptual study of laws of motion, forces, momentum, energy, properties of matter, heat, wave motion, sound, electricity, magnetism, light, atomic and nuclear physics. (Semester Credit Hours: 4)

Text: Conceptual Physics, 12th ed. by P. G. Hewitt (required)
Material: Chapters 1-34

Lab Manual: Laboratory Investigations for Basic Physics, 4th ed. by D. R. Fazzini (req.)

Keypad: iClicker

Supplement (optional): Practicing Physics by P. G. Hewitt

Location: Lec.: BIC-3606 Lec. Time: MWF: 9:00-9:50 AM
Lab: BIC-3736 Lab Time: T: 9:00-11:50 AM or R: 9:00-11:50 AM

Course Objectives:

Upon successful completion of this course you should be able to do the following:
1. Use observations to formulate hypotheses
2. Demonstrate a functional understanding of physical phenomena and their relationships to daily living
3. Describe the relationships among different units of measure
4. Interpret and explain the relationships among an object’s position, displacement, velocity, and acceleration
5. Identify and distinguish different types of forces and identity the reaction force to any action force
6. Describe and calculate the effect of external forces on an object’s motion
7. Create and label simple free-body diagrams
8. Identify and calculate the different forms of energy (potential, kinetic, and mechanical) and describe how energy is converted from one form to another
9. Deduce the outcome of collisions of two particles
10. Interpret and describe the relationships among an object’s angular position, displacement, velocity, and acceleration
11. Describe and calculate the effect of external torques on an object’s rotation
12. Determine the stability of an object using the relationship between center of gravity and support base
13. Classify matter and differentiate among elements, compounds, atoms, and molecules
14. Identify the constituents of an atom and how they are organized
15. Differentiate among density, mass, volume, and weight
16. Calculate stretch or compression of an elastic body using Hooke’s law
17. Determine buoyancy using Archimedes’ principle
18. Identify the differences among heat, temperature, and internal energy
19. Explain how matter behaves when it absorbs or releases thermal energy
20. Apply the relationship among heat, mass, and change in temperature
21. Explain the differences among conduction, convection, and radiation and identify thermal conductors and insulators
22. Identify the direction of heat
23. Recognize that energy is conserved and that energy goes from more useful to less useful forms
24. Distinguish between transverse and longitudinal waves and provide examples of each
25. Describe the relationships among amplitude, frequency, period, wavelength, and wave speed of a wave
26. Calculate positions of maximum destructive and constructive interference for waves
27. Explain how sound waves travel and describe Doppler shifts
28. Identify, construct, and analyze simple electric circuits (series and parallel circuits)
29. Describe the flow of electricity in terms of voltage, current, and charge and demonstrate mathematical understanding of the relationship among amperes, volts, and coulombs
30. Explain what happens when a magnet moves through a wire coil (and vice versa)
31. Explain how electromagnets and transformers work
32. Describe the relationship between the color of a glowing object and its temperature
33. Compare color mixing of light and color mixing of paints
34. Describe image characteristics produced by plane, concave, and convex mirrors
35. Describe image characteristics produced by plane, concave, and convex lenses
36. Explain the phenomena of reflection and refraction
37. Identify components of the electromagnetic spectrum
38. Differentiate incandescence, fluorescence, and phosphorescence in light emission
39. Explain why atoms are radioactive
40. Describe different types of radiation and their effects
41. Describe nuclear fission and fusion processes and their importance in society

Course Logistics:

GENERAL COURSE INFORMATION can be found through the class webpage:

http://www.cod.edu/people/faculty/fazzinid/PHY1100/PHYS1100.html

and the Blackboard website:

https://bb.cod.edu/webapps/login/

Check the class webpage regularly for general announcements and assignment updates as the Blackboard site is currently under construction. These sites will provide important announcements and course updates such as reading and written homework assignments. These sites are updated on a (nearly) daily basis.

READING assignments will be announced in class and posted on the class webpage. It is assumed that you have read the assigned material by the due date (see QUIZZES). Check the class webpage regularly for assignment updates.

HOMEWORK assignments will be provided online using the FlipItPhysics homework system. You will be provided a username and a temporary password to access your assignments. All of the homework for the entire term has been generated. Again, check the class webpage regularly for assignment updates.

The homework will consist of two types: Homework Questions and Homework Exercises & Problems. The Homework Questions consist of 10 or so multiple-choice questions and are based upon the reading and discussions from the assigned chapter(s). These tend to be conceptual in nature, but may also require a simple calculation. These Homework Questions must be submitted by 8:30 AM on the due date unless otherwise announced. Once the final cut-off time has elapsed, you will not be able to submit answers or make any changes. (In addition to the Homework Questions, short in-class exercises are used to monitor conceptual understanding. [See REMOTE KEYPADS.] These can typically be answered by keeping up with the reading assignments and class discussions.)
The *Homework Exercises and Problems* assignments typically consist of several computational exercises and are also due at **8:30 AM** of the date shown. In general, these assignments involve a numerical answer and may be printed for off-line completion if you desire. You may return to the computer to enter your answers and then submit. Only the electronic submissions will be accepted (prior to the cut-off time) for credit.

Be aware that it is very important that you make an honest attempt to work through the questions, exercises, calculations and problems since doing the homework is a primary technique for learning the material. It is also very important that you be able to understand the solutions conceptually rather than just memorizing formulas since the exam questions and problems generally require you to demonstrate application of the concepts being assessed. Be sure that you can answer any assigned question or solve any assigned problem since they may appear on an exam. It is your responsibility to seek assistance from your instructor and/or other resources if you are having difficulties.

**QUizzes** consisting a few multiple-choice, matching, or short response questions based upon the reading assignment due that day are administered with warning or without warning prior to the start of each chapter of the text—almost every class. (You must be in class for the quizzes at the time they are administered. There are no “make-ups.” However, there will be extra credit quizzes administered from time to time.) These are primarily designed to make sure that students keep up with the assigned reading and thus have some familiarity with the topics that are about to be discussed.

**Remote Keypads (iClickers)** will be required for each student. The system will allow you to further interact with the instructor during the lecture. You will be able to respond to questions and give feedback as the course progresses. Responses are recorded and scored. Keypad questions typically consist of surveys, conceptual questions or short calculations and are used to monitor conceptual understanding. The questions are designed to surface possible misconceptions and uncover some of the common pitfalls that confuse many students. In most cases, students are encouraged to participate in small group discussions with fellow students while answering these questions. The scoring is used as a measure of class attendance and participation and may be used for as part of the final grade determination particularly in borderline situations.

**Exams** will consist of two “one-hour” exams and a “2-hour” final exam. The one-hour exams and the first hour of the final exam typically consist of 30-40 multiple choice questions and 5-8 problems. The second hour of the final exam is comprehensive and typically has 70-80 multiple choice questions. The questions and problems are derived from homework sets, sample problems from the text and examples worked in class or the laboratory. All exams are closed book and closed note. However, you will be provided with a sheet of “possibly useful information” that contains formulas, constants, etc.

Tentative Exam schedule:

- **Exam I:** 9:00 AM-9:50 AM, Wednesday, Mar. 2nd  Chapters 1-10
- **Exam II:** 9:00 AM-9:50 AM, Wednesday, Apr. 13th  Chapters 11-21
- **Final Exam:** 9:00 AM-10:50 AM, Wednesday, May 18th  Chapters 1-34
LABORATORY sessions meet once per week and are required for this course. (When you meet depends on the section in which you are enrolled. Check your course schedule.) The laboratory section is designed to provide you with hands-on experiences related to the topics that are discussed in the classroom. During the lab, you will make predictions, answer questions, and record observations in the required manual. Throughout the session and upon successful completion of the lab, the instructor will “stamp” your work and record attendance. Laboratory homework assignments are to be completed over the week and submitted at the beginning (that is, 9:00AM) of the next laboratory session. Only officially stamped work will be accepted for credit. Each lab is graded in two parts: 1) completion of the required measurements and “in-lab” questions and 2) completion of the laboratory homework. Each piece is worth 50% of the total grade for that lab. There is a 10% penalty for any lab that is not submitted by 9:00AM of the due date.

PRE-LABS for each laboratory session are found in laboratory manual. Each pre-lab consists of a few short questions based on the reading of that week’s lab. These are to be completed prior to entering the lab. Pre-labs are due at the beginning (that is, 9:00 AM) of the lab session. (Suggestion: do not be late for lab.) Each pre-lab is submitted by 9:00 AM of the particular session is worth up to 10% bonus credit of the standard lab grade. The pre-labs must be submitted by 9:00 AM of the lab session in order to receive the bonus. Pre-labs received after 9:00 AM are recorded, but do not count for bonus. There is a 10% lab score penalty for not submitting the pre-lab for that week’s lab before the end of that week’s lab session.

PARTICIPATION in the course can have a reflection in the overall final grade. Items such as attendance, attitude, sincerity, changes in performance, keypad scores, iClickers, etc. will be considered in borderline situations.

GRADING is tentatively based on the following breakdown:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>150</td>
<td>A: &gt; 900</td>
</tr>
<tr>
<td>Quizzes / Clickers</td>
<td>150</td>
<td>B: &gt; 800</td>
</tr>
<tr>
<td>Laboratory*</td>
<td>150</td>
<td>C: &gt; 700</td>
</tr>
<tr>
<td>2 Hourly Exams</td>
<td>300 (150 pts. each)</td>
<td>D: &gt; 600</td>
</tr>
<tr>
<td>Final Exam</td>
<td>250</td>
<td>F: &lt; 600</td>
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</tbody>
</table>

Depending on other factors involved with the course, it is possible for the grade cut-offs to be lowered by up to 50 pts., but do not count on it.

*As the laboratory is a required part of the course, your final grade will drop one full letter for every two sessions that are missed. As there are no “make-ups,” you are strongly advised not to miss any lab sessions.
PHYSICS 1100 COURSE EXPECTATIONS

What Dr. Fazzini Expects from You:

- You will have read the syllabus.
- You will be punctual to class.
- You do not make or receive telephone calls or text messages during class or lab sessions.
- You demonstrate respect for what I and your fellow students have to say.
- You will come to class prepared (pencils, calculator, iClicker, etc.)
- You will come to class ready to ask and answer questions of substance on the day’s topic(s).
- You will concentrate exclusively on this course during the class hours of this course.
- You will notify me prior to class if you have to leave early.
- You will take responsibility for your own learning.
- You will only use email as a tool to set up a face-to-face meeting with me.
- You will take responsibility for your own learning.

What You Can Expect from Dr. Fazzini:

- I will be punctual to class.
- I will give each of you a fair share of my attention.
- I will work to make the class interesting and relevant.
- I will make myself available as a helpful resource outside of class.
- I will work to help you learn the material and perform at your best.
- I will be the sole arbiter of partial credit.
- I will grade the QUALITY of your work rather than the amount of time and effort you spent on it. (In other words, you will be assessed on your demonstrated performance rather than on anecdotal testimony.)

Miscellaneous:

LATE MATERIAL & MAKE-UPS:
All quizzes and exams must be completed on the scheduled date at the time they are scheduled. There are no make-ups for any reason. If absent for either “one-hour” exam, then the score of the final exam will be applied to one (and only one) missing exam.

All online homework must be submitted by the cut-off time must be submitted at the beginning (9:00 AM) of next lab session to receive credit. Any laboratory assignment submitted after 9:00 AM of the lab session due date but still during that session receive a 10% penalty. After that, the penalty is an additional 10% for each 24 hours past the original due date and time. After a particular lab is returned, that lab cannot be submitted for credit. (Note that you can still receive up to 50% credit from the completion of the
data acquisition and “in-lab” questions as long as it was officially stamped by the instructor and submitted on time.)

CALCULATORS, LAPTOPS & CELL PHONES:
Students may use their own calculator during exams. There is no sharing of calculators during exams and NO CELL PHONES CALCULATORS may be used during exams.

Students may use laptop computers or tablets to take notes during lecture only under the following conditions: 1) the screen must be horizontal on the desk so that I can see it at any given time and 2) you email a copy of that day’s notes within 10 minutes after the end of class. If these conditions cannot be met, then you may not use the device in class.

The proprietors of any cell phone or other device that are heard to go off in class or the lab ensure themselves a "0" on the next Quiz. Disruption during an exam will result in 5%-deduction off that exam score (10% if during the final exam).

WITHDRAWAL POLICY:
The last day to withdraw from this course is Saturday, April 16th, 2016. After that date, students may file a Petition for Late Withdrawal through the Registration Office. A Petition for Late Withdrawal will granted for extenuating circumstances only, including student illness, death in the immediate family, family emergencies, call to active duty, or other appropriate extenuating circumstances. The student will be required to provide appropriate documentation for all requests for late withdrawal. Prior to withdrawing from this class, students are strongly encouraged to speak to their instructor.

INCOMPLETE POLICY:
Under extraordinary circumstances (such as an extended medical emergency or family tragedy) a student currently earning “C” or better may not be able to complete all of the course requirements. In such instances, the student may petition the instructor for an “incomplete” grade. Only if the instructor deems the request as warranted will a contract agreement be made between the student and instructor as to how the course will be completed. After the contract is signed by both the students and the instructor, the student will receive a grade of “I”. Note: The course must be completed with the same instructor and within one calendar year of the end of the term for which the student was enrolled.

If the student does not complete the requirements for the course as prescribed in the agreement, the “I” grade will automatically revert to a grade of “F.” It is advised that the students be fully aware of the consequences of receiving an incomplete grade and understand the terms described in the COD Catalog, p. 101: Grade of Incomplete.

CONDUCT:
Anyone caught cheating or plagiarizing will receive an automatic failure for the course. You will not be allowed to drop the class if you are found in violation of this section. It is expected that you are aware of and follow the guidelines for conduct as described in the COD Catalog, pp. 108-110: Students Code of Conduct (Board Policy 20-35) and that you are aware of the definitions of the terms described therein.
ATTENDANCE/TARDINESS:
In general, formal attendance is recorded by means of “iClickers,” submitted quizzes, and officially stamped laboratory work. Students who have missed 5 or more classes or labs AND are not passing with a grade of “C” or better by Wednesday, March 16th, 2016 will be considered in “non-pursuit” and may be dropped from the course by the instructor. Students who do not “click in” during the class do not necessarily have their attendance recorded.

DISRUPTIONS:
The proprietors of any cell phone or other device that are heard to go off in class or the lab ensure themselves a "0" on the next Quiz. Disruption during an exam will result in 5%-deduction off that exam score (10% if during the final exam).

Individuals that exhibit disruptive behaviors that interfere with the lectures and/or laboratory sessions will be removed from the class so that those individuals who wish to learn physics can do so. Those individuals removed must then conference with either the Dean or an Associate Dean in Natural & Applies Sciences Division. Those individuals may then rejoin the class pending the outcome of the conference.

COMMUNICATION:
You should only use email as a method to set up a face-to-face meeting with me if my regular office hours conflict with your schedule. The subject line should read, “Meeting request.” In your request, include at least two times when you would like to meet and a brief (one or two sentence) description of the reason for the meeting. Emails sent for any other reason will not be considered or acknowledged. You are strongly encouraged to ask questions about the syllabus during class time. For more in-depth discussions (such as guidance on assignments) plan to meet in my office. You can also call my office. Our conversations should take place in person or over the phone rather than through email. This allows us to get to know each other better and fosters a more collegial learning atmosphere.

Otherwise, the only other email would be your course notes that you took if you used a laptop. The subject line should read, “Physics 1100 Notes (date)”.

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## PHYSICS 1100 TENTATIVE SCHEDULE for Spring 2016

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Chapter(s)</th>
<th>Topic(s)</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 25-29</td>
<td>1</td>
<td>Introduction &amp; The Nature of Science</td>
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<tr>
<td></td>
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<td>2</td>
<td>Inertia &amp; Newton's 1st Law of Motion</td>
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<tr>
<td>2</td>
<td>Feb. 1-5</td>
<td>3</td>
<td>Describing Linear Motion</td>
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<td></td>
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<td>4</td>
<td>Newton's 2nd Law of Motion</td>
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<td>3</td>
<td>Feb. 8-12</td>
<td>5</td>
<td>Interactions &amp; Newton's 3rd Law of Motion</td>
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<td></td>
<td></td>
<td>6</td>
<td>Impulse, Momentum &amp; Conservation Laws</td>
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<td>4</td>
<td>Feb. 15-19</td>
<td>7</td>
<td>Work &amp; Energy</td>
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<td>8</td>
<td>Torque &amp; Rotational Motion</td>
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<td>5</td>
<td>Feb. 22-26</td>
<td>9</td>
<td>Universal Gravitation</td>
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<td>10</td>
<td>Projectile/Satellite Motion</td>
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<td>6</td>
<td>Feb. 29-</td>
<td>Exam I</td>
<td>Chapters 1-10</td>
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<td></td>
<td>Mar. 4</td>
<td>11 &amp; 12</td>
<td>Atomic Nature of Matter &amp; Solids</td>
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<td>7</td>
<td>Mr. 7-11</td>
<td>13</td>
<td>Pressure &amp; Archimedes' Principle</td>
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<td>8</td>
<td>Mar. 14-18</td>
<td>14</td>
<td>Liquids, Gases &amp; Plasmas</td>
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<td>9</td>
<td>Mar. 21-25</td>
<td>15</td>
<td>Temperature &amp; Heat</td>
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<td></td>
<td>NO CLASSES</td>
<td>16</td>
<td>Heat Transfer</td>
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<tr>
<td>10</td>
<td>Mar. 28-</td>
<td>17</td>
<td>Phase Changes</td>
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<tr>
<td></td>
<td>Apr. 1</td>
<td>18</td>
<td>Laws of Thermodynamics</td>
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<tr>
<td>11</td>
<td>Apr. 4-8</td>
<td>19</td>
<td>Vibrations &amp; Waves</td>
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<td>20 &amp; 21</td>
<td>Sound &amp; Music</td>
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<tr>
<td>12</td>
<td>Apr. 11-15</td>
<td>Exam II</td>
<td>Chapters 11-21</td>
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<td></td>
<td>22 &amp; 23</td>
<td>Electrostatics &amp; Electric Circuits</td>
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<tr>
<td>13</td>
<td>Apr. 18-22</td>
<td>24</td>
<td>Magnetism</td>
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<td>25</td>
<td>Magnetic Induction</td>
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<td>14</td>
<td>Apr. 25-29</td>
<td>26 &amp; 27</td>
<td>Light &amp; Color Properties</td>
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<td></td>
<td>28</td>
<td>Reflection &amp; Refraction</td>
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<tr>
<td>15</td>
<td>Apr. 27-</td>
<td>29 &amp; 30</td>
<td>Light Waves &amp; Light Emission</td>
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<td>May 1</td>
<td>31</td>
<td>Light Quanta</td>
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<td>16</td>
<td>May 9-13</td>
<td>32</td>
<td>The Atom</td>
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<tr>
<td></td>
<td></td>
<td>33 &amp; 34</td>
<td>Radioactivity &amp; Nuclear Processes</td>
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<tr>
<td>17*</td>
<td>May 18</td>
<td>Final Exam</td>
<td>All covered material: Chapters 1-34</td>
</tr>
</tbody>
</table>

Denotes shortened week due to final exams

There are NO CLASSES on the following dates:
Monday-Friday, March 21st-25th due to Spring Break
Detailed Topical Outline:

Nature of Science
   Units and scientific measurement
   Scientific methodology
   Science and technology

Mechanics
   Linear motion (position, velocity, and acceleration)
   Forces and Newton's laws of motion
   Momentum and impulse
   Work and energy
   Conservation laws
   Rotational motion, torque, and angular momentum
   Gravity, projectile motion, and satellite motion

Properties of Matter
   Atomic nature of matter
   Structure and classification of matter
   States of matter
   Density and elasticity
   Pressure
   Archimedes' principle and buoyancy
   Pascal's principle
   Boyle's law and Bernoulli's principle

Heat and Thermodynamics
   Temperature, heat, and internal energy
   Specific heat capacity and thermal expansion
   Heat transfer (conduction, convection, and radiation)
   Phase changes and latent heats
   First law of thermodynamics
   Heat engines and efficiency
   Entropy and the second law of thermodynamics

Vibrations and Waves
   Wave description and motion
   Transverse and longitudinal waves
   Wave interference and standing waves
   Sound, beats, and the Doppler effect
   Forced vibrations and resonance

Electricity and Magnetism
   Electric charges, forces, and fields
   Coulomb's law
   Charge conservation
   Electrical potential and electrical potential energy
Electric circuits and Ohm's law
Magnetic poles, forces, and fields
Electromagnets, electromagnetic induction, and transformers

Properties of Light
- Electromagnetic spectrum
- Color and color mixing
- Reflection and refraction
- Mirrors and lenses
- Interference, diffraction, and polarization
- Incandescence, fluorescence, and phosphorescence
- Light quanta (photons)

Atomic and Nuclear Physics
- Atomic spectra and the Bohr model
- Atomic nucleus, isotopes, radioactivity, and half-life
- Nuclear fission, fusion, and mass-energy equivalence

Disclaimer:
To the best of the instructor’s knowledge, the information in this syllabus was correct and complete at the start of the semester. However, the instructor reserves the right, acting within the policies and procedures of the College of DuPage, to make changes in course content, instructional techniques or grading policy during the term.

Not every topic in each assigned chapter may be discussed in class. However, you are responsible for every topic in each assigned chapter unless otherwise stated. If you are having trouble with a topic that is not discussed in class, it is your responsibility to seek out the instructor and/or other resources to ensure understanding of that topic.

It is assumed that you have read this course syllabus. Your continued enrollment in this course means that you accept the terms and conditions outlined in this syllabus.