A. **Academic Division:** Business, Industry and Technology

B. **Discipline:** Physics

C. **Course Number and Title:** PHYS2030 – College Physics II

D. **Course Coordinator:** Gary Wood  
   **Assistant Dean:** Daniel Wagner

**Instructor Information:**
- **Name:** Click here to enter text.
- **Office Location:** Click here to enter text.
- **Office Hours:** Click here to enter text.
- **Phone Number:** Click here to enter text.
- **E-Mail Address** Click here to enter text.

E. **Credit Hours:** 4  
   Lecture: 3 hours  
   Laboratory: 3 hours

F. **Prerequisites:** PHYS2010 (a minimum grade of C required)

G. **Syllabus Effective Date:** Fall, 2017

H. **Textbook(s) Title:**

   *Physics for Scientists and Engineers with Modern Physics*
   - **Author(s):** Giancoli
   - **Copyright Year:** 2008
   - **Edition:** 4th
   - **ISBN #:** 9780131495081

I. **Workbook(s) and/or Lab Manual:**

   Labs will be distributed online.

J. **Course Description:** This is a calculus based physics course that has a study of heat to include calorimetry, expansion, heat capacity, conductivity, phase change, kinetic theory and gas laws. A study of light including its nature, and geometric optics. Also a study of electricity and magnetism including electric charges at rest, potentials, capacitance and dielectrics, current, resistance, and voltage, alternating circuits theory of frequency, reactance, impedance, power and resonance, magnetic field definition and effects on moving charges and conductors.
K. College-Wide Learning Outcomes:

<table>
<thead>
<tr>
<th>College-Wide Learning Outcome</th>
<th>Assessments - - How it is met &amp; When it is met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication – Written</td>
<td>All listed assignments are graded</td>
</tr>
<tr>
<td>Communication – Speech</td>
<td></td>
</tr>
<tr>
<td>Intercultural Knowledge and Competence</td>
<td></td>
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<tr>
<td>Critical Thinking</td>
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<td>Information Literacy</td>
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<tr>
<td>Computation</td>
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</tbody>
</table>

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Assessments – How it is met &amp; When it is met</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Calculate the Doppler Shift of sound waves for either the source or observer moving.</td>
<td>Homework, labs, quizzes, and exams during the weeks 1-16</td>
</tr>
<tr>
<td>2. Solve for indicated variables in problems involving Archimedes' principle or Bernoulli's principle.</td>
<td>Homework, labs, quizzes, and exams during the weeks 2-16</td>
</tr>
<tr>
<td>3. Solve for the pressure, volume, temperature, mass of gas, or amount of gas in ideal gas law problems.</td>
<td>Homework, labs, quizzes, and exams during the weeks 3-16</td>
</tr>
<tr>
<td>4. Calculate the thermal expansion and thermal stresses in an object given the material and temperature range.</td>
<td>Homework, labs, quizzes, and exams during the weeks 3-16</td>
</tr>
<tr>
<td>5. Solve for the indicated variables in calorimetric problems with or without change of phase and involving no more than three materials.</td>
<td>Homework, labs, quizzes, and exams during the weeks 4-16</td>
</tr>
<tr>
<td>6. Calculate the heat loss due to conduction, convection, or radiation given the temperature of an object and its environment.</td>
<td>Homework, labs, quizzes, and exams during the weeks 4-16</td>
</tr>
<tr>
<td>7. Calculate the net electric force and potential energy of a test charge and the electric field and electric potential at a point due to a specified array of not more than three point charges at rest.</td>
<td>Homework, labs, quizzes, and exams during the weeks 5-16</td>
</tr>
<tr>
<td>8. Calculate specified electrostatic or kinematic variables due to a specified electric field or charge distribution using conservation of energy.</td>
<td>Homework, labs, quizzes, and exams during the weeks 6-16</td>
</tr>
<tr>
<td>9. Calculate the equivalent capacitance of a specified network of capacitors and the charge on, potential difference across and energy stored by specified capacitors in the network.</td>
<td>Homework, labs, quizzes, and exams during the weeks 6-16</td>
</tr>
<tr>
<td>10. Calculate current, resistance, electromotive force, power loss, potential difference, and resistivity for specified parts of a direct current circuit.</td>
<td>Homework, labs, quizzes, and exams during the weeks 7-16</td>
</tr>
<tr>
<td>11. Calculate related current, magnetic force and magnetic flux, induced electromotive force, and torque for magnetic field problems.</td>
<td>Homework, labs, quizzes, and exams during the weeks 11-16</td>
</tr>
<tr>
<td>12. Calculate the peak current, RMS current, impedance, peak voltage, and RMS voltage for alternating current problems.</td>
<td>Homework, labs, quizzes, and exams during the weeks 13-16</td>
</tr>
<tr>
<td>13. Calculate the position, size and nature of an image (or object) given a problem in geometrical optics with no more than two optical devices.</td>
<td>Homework, labs, quizzes, and exams during the weeks 15-16</td>
</tr>
</tbody>
</table>

Evaluation of the above will be determined by:

1. The appropriate solution formula
2. Correct substitution into said formula
3. The logical consistency of the methods and mathematical steps
4. Correctness of the final numerical result, including proper units

The students will develop the following skills to meet the above outcomes.
1. Use computers as a tool to gather and process data from an experiment.
2. Identify and use the proper units for physical quantities.
3. Interpret and construct graphs and diagrams that describe relationships among physical variables and objects.
4. Interpret formulas by identifying the meaning of constants, describing the conditions for which the formula is valid, and using mathematical relationships to predict how a change in one variable affects the value of another variable.
5. Given a problem, decide what information is missing and what given information is irrelevant. Obtain the missing information and solve the problem.
6. Integrate learning from early units in the course to solve a problem later in the course.
7. Apply appropriate physics concepts to solve problems.
8. Determine whether or not the result of a calculation is reasonable.

M. Topical Timeline (Subject to Change):

1. Sound
2. Fluids
3. Temperature & Kinetic Theory
4. Heat
5. Electric Charge and Electric Field
6. Electric Potential
7. Electric Currents
8. DC Circuits
9. Magnetism
10. Electromagnetic waves
11. Gauss Law
12. Kirchhoff’s Rules
13. Ampere’s Law
14. Electromagnetic Induction and Faraday’s Law
15. Light: Geometric Optics

Labs

1. Sound Resonance – Explore the dependency of sound resonance on frequency and wavelength and determine the speed in sound in air using a variable length air column and tuning forks.
2. Pascal's Principle – Discover the relationship between force, area, and pressure using a Hydraulic-Pneumatic system.
3. Coefficient of Linear Expansion – Measure the Coefficient of Linear Expansion for different metals using a boiler, steam jacket, dial micrometer, thermometers, and different metal rods.
4. Specific Heat – Measure the Specific Heat for different metals using a boiler, calorimeter, and different metal shot.
5. Charging by Induction and Conduction – Explore charging by induction and conduction and the charge distribution on two conductive spheres using a proof plane, Faraday ice pail, electrostatic voltage source, and electrometer.
6. Capacitance and Dielectrics – Determine the relationship between capacitance, area, and plate distance and the effects of dielectrics using a variable capacitor, proof plane, conductive sphere, Faraday ice pail, electrostatic voltage source, and electrometer.
7. Ohm’s Law & Resistivity – Derive Ohm’s Law by measuring the current and voltage using various resistors, a battery, electronics board, and multimeters. Explore the relationship between resistance, resistivity, length, and area using various wire coils, a battery, and multimeters.
8. Resistances, Voltages, & Currents in Circuits – Discover the relationship between resistances,
voltages, & currents in both series and parallel circuits using various resistors, a battery, electronics board, and multimeters.


10. Capacitors in Circuits – Discover the relationship between capacitance, voltages, & currents in both series and parallel circuits and determine the decay constant of different capacitors and resistors using various capacitors, resistors, a battery, an electronics board, and multimeters.

11. Force on a current in a Magnetic Field – Determine the relationship between force, current, and magnetic field strength using a Magnetic Field Balance and a power supply.

12. Magnetic Fields In a Coil – Discover the relationship between magnetic field strength, current, number of turns and length of a coil using a magnetic field sensor, a power supply, and a coil set.

13. Electric Motors, Generators, & Transformers – Explore the basic principles for electric motors, generators, & transformers using AC & DC armatures, multimeters, a power supply, and a coil set.

14. RLC Circuits – Determine the phase of the voltage and current and at resonance in an LRC series circuit using a power supply, voltage and current sensors, and an LRC series circuit.

15. Index of Refraction – Measure the index of refraction for different liquids using a precision refraction apparatus.

N. Course Assignments:

1. Laboratory activities
2. Quizzes
3. Homework
4. Exams
5. Final exam

O. Recommended Grading Scale:

<table>
<thead>
<tr>
<th>NUMERIC</th>
<th>GRADE</th>
<th>POINTS</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>93–100</td>
<td>A</td>
<td>4.00</td>
<td>Superior</td>
</tr>
<tr>
<td>90–92</td>
<td>A-</td>
<td>3.67</td>
<td>Superior</td>
</tr>
<tr>
<td>87–89</td>
<td>B+</td>
<td>3.33</td>
<td>Above Average</td>
</tr>
<tr>
<td>83–86</td>
<td>B</td>
<td>3.00</td>
<td>Above Average</td>
</tr>
<tr>
<td>80–82</td>
<td>B-</td>
<td>2.67</td>
<td>Above Average</td>
</tr>
<tr>
<td>77–79</td>
<td>C+</td>
<td>2.33</td>
<td>Average</td>
</tr>
<tr>
<td>73–76</td>
<td>C</td>
<td>2.00</td>
<td>Average</td>
</tr>
<tr>
<td>70–72</td>
<td>C-</td>
<td>1.67</td>
<td>Below Average</td>
</tr>
<tr>
<td>67–69</td>
<td>D+</td>
<td>1.33</td>
<td>Below Average</td>
</tr>
<tr>
<td>63–66</td>
<td>D</td>
<td>1.00</td>
<td>Below Average</td>
</tr>
<tr>
<td>60–62</td>
<td>D-</td>
<td>0.67</td>
<td>Poor</td>
</tr>
<tr>
<td>00–59</td>
<td>F</td>
<td>0.00</td>
<td>Failure</td>
</tr>
</tbody>
</table>

P. Grading and Testing Guidelines:

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Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

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S. **Classroom Expectations:**

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T. **College Procedures/Policies:**

**Attendance Requirements:** All students are required to attend all scheduled classes and examinations. Each faculty member has the right to establish regulations regarding attendance that he/she considers necessary for successful study.

Students who do not attend classes may be administratively withdrawn from those classes. However, failure to attend classes does not constitute withdrawal, and students are expected to process a formal withdrawal though the Student Records Office in Kee Hall.

**Student engagement requirements:**

Student engagement is based on the “active pursuit” of learning which can be measured by class attendance, class participation (in class or online), taking required quizzes/examinations, and submission of work assignments or papers. Student engagement consists of a student attending at least 60% of the class sessions (there should be attendance throughout the term) and/or completing 75% of the assignments listed on the syllabus at the midpoint in the term. Exceptions can be made when there is on-going communication between the student and faculty member. The communication must be documented and the faculty member and student must be in agreement regarding the exception. Students not meeting the expectation will be administratively withdrawn from class. If a student believes he/she was administratively withdrawn in error, he/she may file an appeal. Being administratively withdrawn may have program and financial aid implications.

**Academic Misconduct** is any activity that tends to compromise the academic integrity of the college, or subvert the educational process. Examples of academic misconduct include, but are not limited to:

1. **Violation of course or program rules** as contained in the course syllabus or other information provided to the student; violation of program requirements as established by departments and made available to students.

2. **Plagiarism** including, but not limited to, submitting, without appropriate acknowledgment, any written, visual or oral material that has been copied in whole or in part from the work of others (whether such source is published or not) even if the material is completely paraphrased in one’s own words. This includes another individual’s academic composition, compilation, or other product, or a commercially prepared paper. Plagiarism also includes submitting work in which portions were substantially produced by someone acting as a tutor or editor.

   Such practices constitute plagiarism regardless of motive. Those who deny deceitful intent, claim not to have known that the act constituted plagiarism, or maintain that what they did was inadvertent are nevertheless subject to penalties when plagiarism has been confirmed.

3. **Cheating** and dishonest practices in connection with examinations, papers and projects, including but not limited to using unauthorized notes, study aids or information on an examination; taking an exam or doing work for another student; providing one’s own work for another student to copy and submit as his/her own; or allowing another student to do one’s work and then submitting the work as one’s own. Also included would be altering a graded work after it has been returned, then submitting the work for re-grading; or submitting identical or similar papers for credit in more than one course without prior permission from the course instructors.

4. **Fabrication** including but not limited to falsifying or inventing any information, data or citation; presenting data that were not gathered in accordance with defined appropriate guidelines, and failing to include an accurate account of the method by which data were collected.
5. **Obtaining an Unfair Advantage** including, but not limited to stealing, reproducing, circulating, or otherwise gaining access to examination materials prior to the time authorized by the instructor; unauthorized collaborating on an academic assignment; taking, hiding or altering resource material; or undertaking any activity with the purpose of creating or obtaining an unfair advantage over another student’s academic work.

6. **Aiding and Abetting Academic Dishonesty** including, but not limited to providing material, information or other assistance to another person with the knowledge that such aid could be used in any of the violations stated above, or providing false information in connection with any inquiry regarding academic integrity.

7. **Alteration of Grades or Marks** including but not limited to, action by the student in an effort to change the earned credit or grade.

In addition, cases of academic dishonesty may involve photocopied materials. Materials used may fall under the Copyright Act. Violations of said Act may subject the user and/or the College to sanctions.

**Statement on Disabilities:** Any student who requires reasonable accommodations related to a disability should inform the course instructor and the Coordinator of Specialized Services (Room 138 in Kee Hall; phone 419-755-4727).

Students who encounter difficulty in any of their courses are encouraged to visit the Tutoring Resource Center (Room 119 in Fallerius Technical Education Center) for tutoring assistance, and the Student Success Center (Room 136 in Kee Hall) for academic assistance, advising services, referrals for personal counseling and Learning Disability (LD) Testing.

**Statement on Withdrawals:** As a student, you are expected to attend class. If you are unable or choose not to attend class, or if for whatever reason you are unable to keep up with the requirements of a course, you need to officially drop the class at the Student Records Office. Refund dates and withdrawal dates will vary slightly from term to term. Contact the Student Records Office for applicable dates. Additionally these dates are posted on the academic calendar available on the college’s website, [www.nclstatecollege.edu](http://www.nclstatecollege.edu), under the Academics heading on the home page and are available at the Student Records Office in Kee Hall. Students should go to the Student Records Office (Room 142 in Kee Hall) to process their withdrawal from any class.

If you choose to walk away from your class without officially withdrawing from it, the faculty member teaching the class must grade your classroom performance on the material available to him or her. This normally results in an “F” grade. An “F” grade can lower your grade point average considerably depending on the total credits accumulated.