

SYLLABUS

COURSE STAFF & CONTACT INFORMATION:

- **Instructor:** N. Sanjay Rebello
 - Contact: Email: rebellos@purdue.edu Phone (cell): 785-537-7543 (for emergency)
 - Office: In Person: PHYS Rm. 228 Online: <https://purdue.webex.com/meet/rebellos>
 - Office Hours (in Person/Online): Wednesday 2:30-3:30 PM (or by appointment)
- **Graduate Teaching Assistant:** Jeffrey W. Murray
 - Contact: Email: murra153@purdue.edu
 - Office (Online): <https://purdue.webex.com/meet/murra153>
 - Office Hours: By Appointment

COURSE CREDITS, MODALITY, MEETING TIMES & LOCATIONS:

- Course Credits: 2 (2 Lecture + 2 Lab)
- Course Modality: Hybrid = Face-to-Face + Asynchronous Online
- Contact Hours: Second 8-week semester
 - **Lecture:**
 - Monday 2:30-3:20 PM, PHYS Rm. 112 (50 minutes) (CRN 25806)
 - Asynchronous Online (50 minutes) (CRN 26065)
 - **Lab:** Two Sections (choose one)
 - Section 002 (CRN 25807) Tuesday & Thursday 1:30-3:20 PM, WALC Rm. 2088
 - Section 003 (CRN 25808) Tuesday & Thursday 3:30-5:20 PM, WALC Rm. 1121

COURSE GOALS: To prepare future elementary teachers to teach physical science (physics and chemistry), in elementary school (grades K-6). The course has the following objectives. To facilitate elementary education majors to:

- understand and apply *physical science concepts* (matter and interactions, motion and stability, energy, waves, and their applications) at a level deeper than but necessary to teach elementary school.
- understand and apply the *engineering design process*, including problem definition, model development and use, investigation, analysis and interpretation of data, application of mathematics and computational thinking, and determination of solutions.

LEARNING OBJECTIVES: In this course, students will...

1. **Recognize and recall information and facts** – including definitions, formulae, and inter-relationships – of the physical science concepts of matter and interactions, motion and stability, energy, and waves.
2. **Demonstrate their knowledge and comprehension** of these physical science concepts *in writing and through multimedia presentations*.
3. **Apply** the information and facts, as well as the knowledge and comprehension, of these physical science concepts to **analyze** real-world systems.
4. **Work in collaborative teams** to apply your knowledge and comprehension and situations and **create** solutions to engineering design challenges.
5. **Communicate** to peers in the class and to the public at large, knowledge and comprehension about the physical science concepts and their applications to engineering design challenges through writing and multimedia presentations.

6. **Evaluate** ideas presented by others, about the physical science concepts and their applications to engineering design challenges through writing and multimedia presentations.

COURSE DESCRIPTION: The course is aimed at facilitating future elementary teachers learn physical science that will prepare them to teach these concepts to future elementary students grades K-6. The course will be focused on learning physical science by doing science i.e. developing understanding by collaborative activities and discussion in the laboratory and lecture and communicating your ideas to others. The course will have one 50-minute lecture and two 110-minute laboratory meetings each week.

The course content is consistent with the CAEP (Council for the Accreditation of Educator Preparation) K-6 Elementary Teacher Preparation Standards (Standard 2: Understanding and Applying Content and Curricular Knowledge for Teaching in *Physical Science* and *Engineering Design*) and the NGSS (Next Generation Science Standards) Disciplinary Core Ideas (DCIs) for the Physical Sciences (*Physical Sciences* PS1, PS2, PS3, and PS4) as well as many of the Science and Engineering Practices (SEPs).

The course will be divided into TWO units: 1) Force, Motion & Mechanical Energy, 2) Electric Circuits, and their applications. All of these units will be delivered through the paradigm of solving engineering design problems. Engineering design involves many different practices: problem definition, model development and use, investigation, analysis and interpretation of data, application of mathematics and computational thinking, and determination of solutions.

TEXTBOOK: There is **NO** textbook in this course. All materials will be provided on Brightspace <https://purdue.brightspace.com/d2l/login>

I>CLICKER: You are required to purchase an I>Clicker that will be used in lecture. I>Clicker Audience response device, ISBN 0-7167-7939-0, Publishers Bedford, Freeman and Worth

To activate your I-Clicker you will need to place the ID-code from the device into Brightspace the first time you login to Brightspace. You should do this as soon as possible since the I-Clicker will be used during the first week of the class in lecture.

COURSE EFFORT: The course will be focused on learning science by doing science i.e. developing your understanding by collaborative activities and discussion in the laboratory and lecture and communicating your ideas to others. It is important that you put an appropriate amount of work time into your schedule at the beginning of the semester for this course. If you start to fall behind, please do not hesitate to contact the instructor for the course.

COURSE CONTENT: The course content will be organized into four instructional units. Each unit will be bookended by an engineering design challenge (see more below). Units 1 and 2 are focused more on physics, and Units 3 and 4 are focused more on chemistry. The four units are as follows:

- **Properties of Materials ('Heat Engine Design' Unit):** Starting with learning how a heat engine works, you will learn about the different phases of materials – solids, liquid, and gases -- and how materials transform from one phase to another. You will then learn more about gases and how they expand and contract and how temperature and pressure affect these processes. Finally, you will learn how it is possible to put heat into a system and extract mechanical work from it.
- **Light & Waves ('Light Detector Design' Unit):** Using light emitted from solids and gases this unit will explore qualitatively the wave behavior of matter with visualization activities to help you understand energy in atoms and explains the working of some everyday devices, such as luminescent materials, light sticks, glow-in-the-dark toys, and infrared detectors. You will design the energy level system of a material with certain light emitting properties.

ALIGNMENT WITH STANDARDS: The course content is consistent with the CAEP (Council for the Accreditation of Educator Preparation) K-6 Elementary Teacher Preparation Standards (Standard 2:

Understanding and Applying Content and Curricular Knowledge for Teaching in *Physical Science* and *Engineering Design*) and the NGSS (Next Generation Science Standards) Disciplinary Core Ideas (DCIs) for the Physical Sciences (*Physical Sciences* PS1, PS2, PS3, and PS4) as well as many of the Science and Engineering Practices (SEPs). Together the four units described above will cover content as described in the **CAEP Standard 2** (Understanding and Applying Content and Curricular Knowledge for Teaching) in ***Physical Science***

- **Matter and Interactions:** Matter can be understood in terms of types of atoms and interactions between and within them. The states (i.e., solid, liquid, gas, or plasma), properties (e.g., hardness, conductivity), and reactions (both physical and chemical) of matter can be described and predicted based on the types, interactions, and motions of the atoms within it.
- **Motion and Stability:** Interactions between two objects can cause changes in one or both of them. An understanding of the forces between objects is important for describing how their motions change, as well as for predicting stability or instability in systems. All forces between objects arise from a few types of interactions including gravity and electromagnetism.
- **Energy:** Interactions of objects can be explained and predicted using the concept of transfer of energy from one object or system of objects to another. The total energy within a defined system changes only by the transfer of energy into or out of the system.
- **Waves and Their Applications in Technologies for Information Transfer:** Waves are a repeating pattern of motion that transfers energy from place to place. Light and sound are wavelike phenomena. By understanding wave properties and the interactions of electromagnetic radiation with matter, scientists and engineers can design systems for transferring information across long distances, storing information, and investigating nature on many scales—some of them far beyond direct human perception.

The alignment between **CAEP Standard 2** (Understanding and Applying Content and Curricular Knowledge for Teaching) in ***Physical Science*** and the four units above are shown in the table below.

Units ⇒ Standards ↓	Properties of Materials	Light & Waves
<i>Matter & Interactions</i>	X	X
<i>Motion & Stability</i>		X
<i>Energy</i>	X	X
<i>Waves & Applications</i>		X

Each unit will be delivered through the paradigm of solving engineering design challenges as described in **CAEP Standard 2** (Understanding and Applying Content and Curricular Knowledge for Teaching) in ***Engineering Design***

- **Engineering Design:** The design process—engineers’ basic approach to problem solving—involves many different practices. They include problem definition, model development and use, investigation, analysis and interpretation of data, application of mathematics and computational thinking, and determination of solutions. These engineering practices incorporate specialized knowledge about criteria and constraints, modeling and analysis, and optimization and trade-offs.

COURSE FORMAT:

The course has two main components that are synchronized

- **Lectures** (One meeting per week: 50-minute) introduce and illustrate concepts through presentation and demonstrations. You will be expected to participate using your I>Clicker.
- **Laboratory** (Two meetings per week each: 1 hour 50 minutes,) is the place where you will interact with other students to develop and test their ideas concerning concepts.

The course has one main components that is asynchronous

- **Asynchronous Lecture** (One meeting per week: 50-minute) introduce and illustrate concepts through presentation and readings, followed by a short quiz.

LECTURES (Face-To-Face): The lecture will review concepts that will be explored in the laboratory. **You will be asked questions during the lecture and your response will be recorded using your I>Clicker.** Typically, you will be given about two minutes to respond. During the response period you are expected to discuss the possible response with other students around you. This discussion is important to the learning process as it helps you to articulate the material that is being introduced. This is a dynamic process, and you should not simply take an answer from another student but listen to their arguments and develop your own argument during the answer period. **You are expected to record your group discussion during clicker questions and upload your responses on Brightspace.**

Lecture is also your chance to ask questions and to discuss things that you find interesting or hard to understand. Please ask questions, as they are an important part of learning.

Lecture participation via I>Clicker is worth 2 points per lecture. Uploading your Group Discussion Audio Recording during I>Clicker questions is worth 4 points per lecture.

Deadline: Group Discussion Audio Recording must be uploaded on Brightspace by **11:59 PM two days after the lecture** in the week of the Lecture. The recording should be a SINGLE AUDIO FILE. You can do this by pressing "Pause" on the recording after each Clicker Question and then clicking "Start" on the next question.

Late Policy: Starting **12:00 Midnight two days after each Lecture, you will lose 1 point as late penalty. You will continue to lose 1 point every 24 hours starting henceforth until you upload your Group Discussion Audio Recording.** The submission will close at 11:59 PM on the day one week after the LAB.

If you should accidentally forget to bring your I>Clicker to the lecture, you need to answer all the questions on paper and hand that paper to the lecturer at the end of class. You need to follow up with an e-mail to your instructor with PHYS 230 in the subject line simply stating that you forget your I>Clicker on a certain date. **You can only do this twice during the semester.**

WARNING: You are expected to attend lecture to participate in the class discussions. Anyone that operates an absent person's I>Clicker to create the illusion that the absent person is present is considered to be participating in fraud. The absent person is also participating in fraud. Such activity is considered cheating and will be treated as such. (See ACADEMIC DISHONESTY below)

LECTURES (Asynchronous Online): You will read materials posted online and complete an online Quiz based on this material. The material will be related to and build on material covered in the class in the face-to-face lecture

Deadline: Please complete the Lecture Quiz **11:59 PM on Sunday** in the week of the Lecture.

Late Policy: Starting **12:00 Midnight two days after each Deadline, you will lose 1 point as late penalty.**

LAB EXPERIMENTS: You will explore and be introduced to the concepts in the lab. To get the most out of the laboratory and to be a good lab partner you will want to be prepared. Rushing through the labs will

hurt your understanding of the concepts and will most likely be reflected on your Quiz and Exam scores. You will need to inform the Lab TA that you are leaving and have your work checked as being complete for that lab before leaving. Laboratory groups will consist of three or four people. You are strongly encouraged to upload your Lab Worksheet (one per student) and any other PowerPoint/Excel/Other files as a group BEFORE you leave lab.

Deadline: Individual Lab Worksheet Uploads (and other Group uploads) must be completed on Brightspace by **11:59 PM one day after the LAB meeting** in the week of the Lab.

Late Policy: Starting **12:00 Midnight two days after the LAB meeting, you will lose 5 points as late penalty. You will continue to lose 6 points every 24 hours starting henceforth until you upload your Lab Worksheet.** The submission will close at 11:59 PM on the day one week after the LAB.

If you need to miss a lab, please be advised that **your absence must be supported by documented evidence such as a letter from the Office of the Dean of Students** for the missed lab to count as an **EXCUSED ABSENCE**. Merely emailing me to tell me why you cannot come is NOT adequate.

REVIEW QUIZZES: There will be **FOUR** Quizzes during the semester, two in each unit. They will cover material that was covered recently in class. The dates are indicated on the schedule. The Quizzes will cover the main concepts of the class. The Quizzes will include both multiple choice and essay type questions. **MAKE UPs will be granted only if your absence is supported by documented evidence such as a letter from the Office of the Dean of Students.**

UNIT EXAMS: There will be **TWO** Exams during the semester. The second exam will in FINAL EXAM week during the assigned FINAL EXAM time for PHYS 230 (See Schedule). They will cover material that was covered recently in class. The dates will be indicated on the schedule. The Exams will cover the main concepts of the class. The Exams will include both multiple choice and essay type questions. **MAKE UPs will be granted only if your absence is supported by documented evidence such as a letter from the Office of the Dean of Students.**

FOUNDATIONAL LEARNING OUTCOME: This course meets the Foundational Learning Outcome (FLO) – SCIENCE established by the Purdue University Undergraduate Curriculum Council, which is defined as “the ability to understand and apply basic scientific, quantitative, and technological content knowledge.” The **key skills** met by this course, the **learning activities**, and the **assessment methods** aligned with them are identified in the table below:

KEY SKILL	LEARNING ACTIVITIES	ASSESSMENT METHODS
1. Think and function as a scientist by using critical thinking and analytical inquiry.	Inquiry-based laboratory activities and questions on quizzes and exams that that require using mathematical thinking, and engaging in an argument stemming from evidence	Rubrics used to assess laboratory reports, answers to open-ended questions, and quantitative questions on quizzes and exams
2. Apply basic scientific, quantitative, and technological methods and knowledge of nature to the solution of scientific problems.	Engineering design challenges in the laboratory that require application of science concepts to solve problems.	Rubrics used to assess written reports and oral presentations on solutions to engineering design challenges.
3. Use the “scientific method” and theories to analyze questions in the physical and natural world.	Inquiry-based laboratory activities and engineering design challenges in the laboratory to asking questions and defining problems.	Rubrics used to assess laboratory reports and engineering design challenge solutions.

KEY SKILL	LEARNING ACTIVITIES	ASSESSMENT METHODS
4. Provide scientific explanations of the nature of the universe and be able to distinguish these explanations from non-scientific explanations.	Inquiry-based laboratory activities including analyzing and interpreting data, and constructing understanding based on the data, and providing evidence-based explanations to support claims.	Rubrics used to assess laboratory reports.

GRADING POLICY:

The components of the letter grade and their maximum values are:

Course Component	Units x Points per Unit	Points
Lecture (Face-To-Face) Participation	5* Lectures x 5 points	25 points
Lecture (Asynch. Online) Quizzes	5** Lecture Quizzes x 8 points	40 points
Laboratory Experiments	13*** Labs x 15 points	195 points
Review Quizzes	4 Quizzes x 10 points	40 points
Unit Exams	2 Exams x 110 points	220 points
TOTAL COURSE POINTS		520 points

* LECTURES 08 – 13 (Face-To-Face): You are allowed to drop ONE out of the 6 (SIX) Lectures.

** ASYNCH LECTURE QUIZZES 01-06: You are allowed to drop ONE out of the 6 (SIX) Asynch. Lect. Quizzes.

*** LABS 17 – 30: You are allowed to drop ONE out of the 14 Labs.

Course letter grades will be assigned based on the following.

Course Grade	Total Course % Scored
A+	97% or more
A	94% – 96.9%
A–	90% – 93.9%
B+	87% – 89.9%
B	84% – 86.9%
B–	80% – 83.9%
C+	75% – 79.9%
C	70% – 74.9%
C–	68% – 69.9%
D	60% – 67.9%
F	59.9% or less

INCOMPLETE

A grade of incomplete (I) will be given only in unusual circumstances. To receive an “I” grade, a written request must be submitted prior to [date] and approved by the instructor. The request must describe the circumstances, along with a proposed timeline for completing the course work. Submitting a request does not ensure that an incomplete grade will be granted. If granted, you will be required to fill out and sign an “Incomplete Contract” form that will be turned in with the course grades. Any requests made after the course is completed will not be considered for an incomplete grade.

TEACHING PHILOSOPHY

As instructors, it is our responsibility to maximize opportunities for every student in the class to learn, grow, and succeed in reaching both my own outcomes for the course and their personal goals and desires related to the class. To meet this responsibility, we draw on pedagogical theory, frameworks, and practices rooted in principles of collaborative learning and student-faculty partnership. For some students, this may feel awkward. Much of our society's discussions about teaching focus on a banking system, in which an instructor deposits knowledge into a student's mind, and students receive, file, store, and ultimately return that information in the same format in which it was deposited. Instead, we focus on student learning, which we define as a process of individual change. This means developing skills to view the world in new ways, and engaging in problem solving, critical thinking, as well as different types of debates, discussions, and dialogues.

GETTING HELP

This course will require a significant amount of time and effort. When a topic is not understood, or if you are stuck on a particular problem, make arrangements to meet with the lecture Instructor or GTA. See any of these during office hours, or make an appointment. We are happy to work to improve your understanding of the course content.

ATTENDANCE POLICY

This course follows Purdue's academic regulations regarding attendance, which states that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email or phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases falling under excused absence regulations, the student or the student's representative should contact or go to the [Office of the Dean of Students website](#) to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted for cases of grief/bereavement, military service, jury duty, and parenting leave. For details, see the [Academic Regulations & Student Conduct section](#) of the University Catalog website.

Guidance on class attendance related to COVID-19 are outlined in the [Protect Purdue Pledge for Fall 2021](#) on the Protect Purdue website.

If you must miss class at any point in time during the semester, please reach out to any of the Course Coordinators via email so that we can communicate about how you can maintain your academic progress. If you find yourself too sick to progress in the course, notify your adviser and notify me via email or Brightspace. We will make arrangements based on your particular situation. Please note that, according to [Details for Students on Normal Operations for Fall 2021](#) announced on the Protect Purdue website, "individuals who test positive for COVID-19 are not guaranteed remote access to all course activities, materials, and assignments."

EXCUSED ABSENCES AND ACADEMIC ACCOMMODATIONS

Excused Absences will **NOT** be granted for the following:

- **Final Examination:** If you have a documentable reason (based on criteria for the Mid-Term Exams below) that prevents you from taking the Final Examination, you will receive a grade of Incomplete for the course and you will have to make arrangements with the Course Coordinators to take the Final Exam at a later date.
- **IClicker Lecture Sessions:** You are allowed to drop a certain number of lectures as indicated in the syllabus. If you miss more than the number of allowed dropped Lectures due to an extended absence you must contact the Dean of Students; and request that a Letter of Approved Absence be sent to the Course Coordinators.
- **Labs:** You are not allowed to drop a lab. If you miss a lab due to an extended absence you must contact the Dean of Students; and request that a Letter of Approved Absence be sent to the Course Coordinators.

If you will be or have been out of classes for five (5) consecutive days, you must contact the Dean of Students; they will send us a Letter of Approved Absence.

Excused Absences for Mid-Term Exams will typically be given for these three circumstances:

- (i) on the advice of a doctor, e.g., illness;
- (ii) personal crisis (e.g., automobile accident, death of a close relative, weather conditions which make it impossible to get to the university); and
- (iii) required attendance at an official Purdue sponsored event or activity (e.g., exam conflict, varsity athletic event, band concert). The following are NOT official Purdue activities: club sports, course field trips, attending a conference. Contact the Course Coordinator IN ADVANCE (if at all possible) by email (preferred) or phone.

You may be eligible for an Excused Absence on a Mid-Term Exam, IF you can provide supporting documented evidence below.

- In case on an extended absence, you must contact the Dean of Students; and request them to send the Course Coordinators a Letter of Approved Absence.
- In case of illness, go to the Purdue University Student Health Center (PUSH). You should receive a slip from the Center with the date, doctor's name, and a telephone number OR go to your private physician and obtain a written excuse. We only need the doctor to verify that your illness justifies your absence, NOT a diagnosis or any personal information.
- In case of accidents, funerals, etc., please provide a police accident report, funeral notice etc.
- In case of required attendance at an official Purdue sponsored event or activity as listed above, you need a letter from the appropriate Purdue organizational unit to indicate that specifies that you are required to be present for a specific official Purdue sponsored event or activity.

Email a scanned copy of the supporting documentation above to the Course Coordinators. If the supporting documentation above is deemed valid by the Course Coordinator, your score for the Mid-Term Exam that you missed will be the average of your scores on the other evening exams.

Accommodations: If you receive notification from the Dean of Students that you are entitled to an accommodation, supported by a DRC Letter, please inform your Course Coordinators. They will then confirm that they have received notification from DRC regarding your accommodation. You will be contacted with regard to the exam accommodations.

CLASSROOM GUIDANCE REGARDING PROTECT PURDUE

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#) and the Violent Behavior Policy under University Resources in Brightspace.

ACADEMIC INTEGRITY

[Purdue's Honor Pledge](#): "As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."

Any effort to represent somebody else's work as your own, or allowing your work to be represented as somebody else's, is cheating. Working with another student on your recitation or homework is NOT cheating and, in fact, is encouraged. However, having somebody else do your work IS cheating.

If a student is found cheating, he or she will receive an F for the course and be reported to the Dean of Students. In serious cases the Dean may suspend or expel the student from the University.

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace table of contents, under University Policies.

NON DISCRIMINATION STATEMENT

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.

EXPECTATIONS REGARDING RESPECT FOR OTHERS

At Purdue, you will come into contact with many people who appear very different from you. Beyond superficial physical differences, members of our Purdue community may hold opinions with which you may disagree and may be very different from you along the infinite number of human dimensions. These physical, intellectual and cultural differences offer the opportunity to learn and enrich your experiences as a student and a human being. Our expectations of you as a member of Purdue and of the larger global community, is that you will at all times show respect for others. Learning how to do so is but one component of your personal growth and one way in which you, together with the rest of our community, can create a more inclusionary environment.

It is your obligation as an individual with the privilege to attend an institution of higher learning to engage with others in respectful ways.

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity. See the Student Widget on our course Brightspace for more information on the Violent Behavior Policy.

MENTAL HEALTH/WELLNESS STATEMENT

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#). Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc. sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at evans240@purdue.edu.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours.

BASIC NEEDS SECURITY

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the [Critical Needs Fund](#)

EMERGENCY PREPAREDNESS

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

CHANGES TO COURSE DUE TO MAJOR CAMPUS EMERGENCY

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Course information will, in general, be disseminated via one or more of the following routes: lecture, recitations, labs, email, and Brightspace.

CONFLICTS

In case of examination conflicts (exams scheduled for the same student at the same time), similar to final examinations, students faced with a direct exam conflict are entitled to reschedule either examination. It is the responsibility of the student to make the request for the necessary arrangements at least one week before the scheduled exam. Course instructors shall not penalize a student who chooses to reschedule an examination under these options. In the event the student is unable to reach an agreement with the course instructors to reschedule one of the exams, the student will contact the Office of the Registrar; the Registrar will make the final decision as to which exam is to be rescheduled and offered at an alternate time; the Registrar will communicate this decision to the course instructor and relevant department head.

In case of examination conflicts with a scheduled evening course, the conflict should be resolved by the course instructors, provided that the student informs them of the conflict at least a week before the exam. If the instructors cannot resolve the conflict, the scheduled evening course takes priority. The examination instructor must offer an alternative time for their exam.

Other conflicts should be resolved between the instructor and the student. Reasons for conflict should be taken under careful and reasonable consideration by the instructor and student. If conflict resolution is not possible, the examination shall take precedence, subject to appeal through the head of the department in which the course is offered.

ACCESSIBILITY

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Students with disabilities must be registered with Disability Resource Center (DRC) (drc@purdue.edu) in the Office of the Dean of Students before classroom accommodations can be provided. If you are eligible for academic accommodations because you have a documented disability that will impact your work in this class, please schedule an appointment with me as soon as possible to discuss your needs.

Purdue University is committed to making learning experiences accessible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

COURSE EVALUATION STATEMENT

During the last two weeks of the semester, you will be provided with an opportunity to give feedback on this course and your instructor. Purdue uses an online course evaluation system. You will receive an official email from evaluation administrators with a link to the online evaluation site. You will have up to 13 days to complete this evaluation. Your participation is an integral part

of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

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Online educational environments, like all learning environments, should provide opportunities for students to reflect, explore new ideas, post opinions openly, and have the freedom to change those opinions over time. Students enrolled in and instructors working in online courses are the authors of the works they create in the learning environment. As authors, they own the copyright in their works subject only to the university's right to use those works for educational purposes (Visit [Purdue University Copyright Office](#)). Students may not copy, reproduce, or post to any other outlet (e.g., YouTube, Facebook, or other open media sources or websites) any work in which they are not the sole or joint author or have not obtained the permission of the author(s).

CHANGES TO SYLLABUS AND SCHEDULE

The Course Coordinators, reserve the right to make changes to this *SYLLABUS* and/or *SCHEDULE* for the course. Any changes will be posted on *Brightspace* and you will receive an email informing you of the changes.

SCHEDULE

This schedule is tentative. In case of revisions, the revised syllabus will be posted on Brightspace.

Week of...	LEC (CRN: 25806) Mon. 2:30-3:20 PHYS Rm. 112 ASYNCH LEC. (CRN 26065)	LAB: Two Sections (choose one) Section 002 (CRN 25807) Tuesday & Thursday 1:30-3:20 PM, WALC Rm. 2088 Section 003 (CRN 25808) Tuesday & Thursday 3:30-5:20 PM, WALC Rm. 1121
10/18	Mon, 10/18: NO LECT. Wed. 10/20 Asynch. Online Lecture Quiz 01	Tue, 10/19: NO LAB Thu, 10/21: Lab 17: Initial Design: Heat Engine Exploration
10/25	Mon, 10/25: Lecture 08 Wed. 10/27 Asynch. Online Lecture Quiz 02	Tue, 10/26: Lab 18: <i>Properties of Materials</i> : States of Matter & Phase Transition Thu, 10/28: Lab 19: <i>Properties of Materials</i> : Gas Laws & Kinetic Theory
11/01	Mon, 11/01: Lecture 09 Wed. 11/03 Asynch. Online Lecture Quiz 03	Tue, 11/02: Lab 20: <i>Properties of Materials</i> : 1 st Law of Thermodynamics Thu, 11/04: REVIEW QUIZ 5 , Lab 21: Applications of 1 st law of Thermo
11/08	Mon, 11/08: Lecture 10 Wed. 11/10 Asynch. Online Lecture Quiz 04	Tue, 11/09: Lab 22: Heat Engines: Ericsson, Stirling & Others Thu, 11/11: REVIEW QUIZ 6 , Lab 23: Final Design: Heat Engine Final Design
11/15	Mon, 11/15: EXAM 3	Tue, 11/16: Lab 24: <i>Light & Waves</i> : Initial 'Making Light' Design Challenge Thu, 11/18: Lab 25: <i>Light & Waves</i> : Light Waves, Mater Waves
11/22	Mon, 11/22: Lecture 11	Tue, 11/23: Lab 26: <i>Light & Waves</i> : Waves in a String Thu, 11/25: NO LAB: Thanksgiving Break
11/29	Mon, 11/29: Lecture 12 Wed. 12/01 Asynch. Online Lecture Quiz 05	Tue, 11/30: Lab 27: <i>Light & Waves</i> : Standing Waves in a String Thu, 12/02: REVIEW QUIZ 7 , Lab 28: <i>Light & Waves</i> : Standing Waves in a String and Sound Waves
12/06	Mon, 12/06: Lecture 13 Wed. 12/08 Asynch. Online Lecture Quiz 06	Tue, 12/07: Lab 29: <i>Light & Waves</i> : Photoelectric Effect Thu, 12/09: REVIEW QUIZ 8 , Lab 30: <i>Light & Waves</i> : Review Lab
EXAM 4: 8:00 – 10:00 AM, Friday, 12/17/2021 in PHYS Rm. 112		