Summer 2020

Tiffany Summerscales

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**PHYS 141**

**General Physics I**

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PHYS 141

**General physics I**

Summer 2020

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# 1 schedule information

Class location: HYH 133

Class time/day: 8:00 am – 12:00 pm, MTWRF

Credits offered: 4

Lab location: HYH 219

Class time/day: 1:00 pm – 3:25 pm OR 3:30 pm – 6:00 pm, MTWR

Credits offered: 0

SGL location: HYH 114

Class time/day: 3:30 pm – 5:00 pm OR 2:00 pm – 3:25 pm, MTWR

Credits offered: 0

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# 2 Instructor Contact

Lecture: Tiffany Summerscales, PhD

Telephone: 269-471-3523

Email: tzs@andrews.edu

Office location: HYH 223

Lab/SGL: TBD

Email:

Office location:

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# 3 DISCLAIMER

This syllabus is subject to change. Subsequent versions will be uploaded and available in iVUE. [🢢TOC](#_interactive__table)

# 4 course description

Algebra based introduction to mechanics, wave motion, sound and thermodynamics. Class meets for 4 weeks, 20 hours of lecture each week. There are 4 Small Group Learning (SGL) sessions each week that meet for 2.5 hours each. There are a total of 12 labs and each lab session is 2.5 hours.

Prerequisite: Math Placement Exam P4 or MATH 167 or MATH 168 [🢢TOC](#_interactive__table)

# 5 course materials

**Required:** For ISBN and price information, please see the listing at the Bookstore [www.andrews.edu/bookstore](http://www.andrews.edu/bookstore)

1. **Text:** Physics Fundamentals, 2nd Edition by Vincent P. Coletta. Physics Curriculum & Insruction, 2010, <http://www.physicscurriculum.com/>
2. **Clicker:** iClicker response unit available at the bookstore <https://www.iclicker.com>

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# 6 PROGRAM oUTCOMES

**Program Outcomes (PO) - Physics Department Outcomes**

1. **CORE:** Understanding key physics ideas, principles, laws, and interpretations in 1/classical mechanics, 2/electricity and magnetism, 3/thermal and statistical physics, 4/modern physics including quantum mechanics and relativity, and 5/experimental methods
2. **BREADTH:**  Understanding key physics ideas, principles, laws and interpretations in several advanced or specialized applications important to graduate study and careers in experimental and theoretical physics, including phenomenology and computational physics
3. **LAB/RESEARCH SKILLS:** Measuring phenomena, collecting data, analyzing and mathematically modeling relationships.
4. **CREATIVE PROBLEM SOLVING:** Using imagination and novel approaches to create original solutions, ideas, and applications and build solutions
5. **CRITICAL THINKING:** Using logic and probability to rule out ideas that will not work to solve problems.  Dividing a problem into manageable, solvable parts.
6. **COMMUNICATION:**  Effectively evaluating and conveying scholarship and learning in written, graphic, and pictorial form as well as in live demonstrations and oral presentations.
7. **CONNECTIONS:**  Connecting scientific, religious, and over views as well as diverse disciplinary and professional cultures.  Networking, leading, working in groups and otherwise conducting science as a preparation for effectiveness in the workplace.

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# 7 STUDENT LEARNING oUTCOMES

**Student Learning Outcomes (SLO) The student should be able to**:

1. Identify the physics principles that apply to physical scenarios and situations.
2. Employ an organized problem solving approach including drawing helpful diagrams.
3. Communicate challenging physics concepts and approaches to peers and engage in the peer learning process.
4. Model phenomena and demonstrate physics principles in a laboratory setting.
5. Have appreciation for the order in and fine workings of creation.

*We have learned that matter is weird stuff. It is weird enough, so that it does not limit God’s freedom to make it do what he pleases. – Freeman Dyson* [🢢TOC](#_interactive__table)

# 8 Topics and Assignments

**Homework (SLO 1-3, 5):** Homework will be assigned and submitted online at <https://learninghub.andrews.edu> . There will be an assignment due every day of class at midnight except on Friday. Instead the “Friday assignments” will be due on Sunday by midnight. Each assignment will relate to material covered in lecture the day before. For example: the assignment due the second day of class will pertain to the material covered the first day. Don’t wait until the due day to start!!!! Starting each assignment before the due day will allow you to formulate your questions early. You are strongly encouraged to discuss homework with the professor, the tutors/LAs and fellow classmates. You are not, however, to use homework “help” websites like cramster or others offering homework solutions. Use of these websites undermines the usefulness of the homework and will ensure poor performance in the class. Extensions may be requested via email 48 hours of a due time and used within 48 hours of the time they are granted. Any further extensions will only be granted in the case of an excused absence. Arrangements for making up work from an excused absence must be made prior to the absence or, in the case of an unforeseen situation, within 24 hours of the time the assignment is due. Illnesses will be excused only with a note from a physician.

**In-Class Problems / SGL Assignments (SLO 1-3, 5):** In class problems will be assigned during lecture meetings and Small Group Learning (SGL) assignments will be given during SGL sessions. It is expected that you will work together in groups to complete these assignments. Each student will turn in their own In Class Assignment paper but SGL scores will be assigned to groups. Adequate time will be provided to complete these assignments during lecture or SGL sessions. In class assignments will not be accepted after the lecture time unless arrangements have been made prior to the end of the class period. The rules for making up an in class assignment in the case of an excused absence are the same as those for homework.

**Student Response Participation (SLO 1, 3, 5):** Each student is expected to purchase a student response unit (clicker), available from the bookstore, and use it to vote on questions posed during the lecture times after discussing them with fellow students. A grade will be given for class participation based on voting. Three days’ worth of voting will be forgiven to cover instances of excused absences, malfunctioning clickers and students forgetting to bring clickers to class. Each student is expected to use their clicker ONLY! Using another student’s clicker to make it seem that they are present when they are not is dishonest and not allowed. Both students involved in dishonest clicker use will receive a zero for their participation scores.

**Labs (SLO 1-5):** Labs will be held during the afternoon, Monday through Thursday. Students are expected to work in pairs to complete the labs. Students are expected to attend the lab section to which they are assigned. Students will be allowed to attend a different lab section only with the prior permission of the lab instructor. To gain the full benefit of the learning that takes place in lab, it is essential that students participate fully in the lab by being on time to the lab and complete the lab during the lab time. For this reason, attendance will be taken at the start of lab and 5 points deducted for any tardiness. The final version of the lab writeup must be uploaded to <https://learninghub.andrews.edu> before midnight on the day of the lab.

**Quizzes & Exams:** A quiz will be given every day of class except Fridays. The quizzes will be open book, open notes. The quizzes will be given at the start of class at 8:00 am. Students who are tardy by more than 10 minutes will not have an opportunity to take the quiz. There will be 3 dropped quizzes. There will be tests during the second half of the class period on Fridays. The rules for making up quizzes and tests in the case of an excused absence are the same as those for homework. There will be a cumulative final exam given the last day of class (Friday, May 29). You may bring an 8.5 by 11 inch piece of paper with anything you wish to write upon it to the tests and two such pieces of paper to the final. Everything on the paper must be hand written. There are no dropped tests. All students are expected to take the final exam, regardless of the grade they have prior to the final.

**Online Course Evaluation:** Near the end of the semester, students will be expected to fill out an online evaluation of the course. An announcement will be made when this evaluation is to be completed.

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Date** | **Class Topic** | **Reading** |
| 1 | M May 4 | Math Warm Up, Measurement & Units  Coordinates & Speed | Appendix A, Measurement & Units  Ch1, Secs 1-2 |
| T May 5 | Displacement, Vectors & Velocity  Acceleration in 1-D | Ch 1, Secs 3-6  Ch 2, Sec 1 |
| W May 6 | Acceleration & Freefall  2D Motion & Projectiles | Ch 2, Secs 2-4  Ch3, Secs 1-2 |
| R May 7 | Projectiles Coninued  Circular & Relative Motion | Ch 3, Secs 3-4 |
| F May 8 | Newton’s 1st and 2nd Laws  Test 1 | Ch 4, Secs 1-7  App A – Ch 3, Sec 2 |
| 2 | M May 11 | Newton’s 3rd Law  Friction & Centripetal Force | Ch 4, Sec 8  Ch 5, Sec 1-3 |
| T May 12 | Gravitation, Work & Kinetic Energy | Ch 6, Secs 1-3 Ch 7, Sec 1 |
| W May 13 | Conservation of Energy | Ch 7, Secs 2-5 |
| R May 14 | Power, Momentum & Impulse | Ch 7, Sec 6 Ch 8, Secs 1-2 |
| F May 15 | Collisions & Glancing Collisions  Rotational Motion  Test 2 | Ch 8, Sec 3  Ch 9, Secs 1-2  Ch 3, Sec 3 – Ch 7, Sec 5 |
| 3 | M May 18 | Torque & Rotational Dynamics | Ch 9, Secs 2-5 |
| T May 19 | Static Equilibrium, Stress & Strain  Pressure | Ch 10, Secs 1-3  Ch 11, Secs 1-2 |
| W May 20 | Fluids | Ch 11, Secs 3-7 |
| R May 21 | Temperature & Thermal Kinematics  Heat | Ch 12, Secs 1-6  Ch 13, Sec 1 |
| F May 22 | Calorimetry & Energy Transfer  Test 3 | Ch 13, Secs 2-5  Ch 7, Sec 6 – Ch 11, Sec 7 |
| 4 | M May 25 | **Memorial Day – No Class** |  |
| T May 26 | Thermodynamics | Ch 14, Secs 1-5 |
| W May 27 | Vibrations & Oscillations | Ch 15, Secs 1-5 |
| R May 28 | Sound | Ch 16, Secs 1-6 |
| F May 29 | **Final Exam** |  |

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# 9 GRADING Weights & Scale

**Grading Weights**

The various course components will be given the following weights in determining grades:

|  |  |
| --- | --- |
| Homework | 15% |
| Quizzes | 15% |
| In-Class / SGL | 10% |
| Participation | 5% |
| Labs | 20% |
| Tests | 20% |
| Final Exam | 15% |

**Grading Scale**

The assignment of grades will follow:

|  |  |  |  |
| --- | --- | --- | --- |
| A | 92% - 100% | C+ | 70% - 80% |
| A- | 90% - 92% | C | 60% - 70% |
| B+ | 88% - 90% | C- | 50% - 60% |
| B | 82% - 88% | D | 40% - 50% |
| B- | 80% - 82% | F | < 40% |

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# 10 Class policies

**Student Responsibility**

Email is the official form of communication at Andrews University. Students are responsible for checking their Andrews University email, Moodle, and iVue alerts regularly. Class emails will be sent to Andrews University email accounts.

**Professionalism**

To prepare students for the professional world, certain behaviors/activities are not allowed in the classroom.

* Cell Phones, Personal Laptops, and Recording devices: Cell phones should be turned off before entering the classroom. Recording devices are allowed only if pre-approved by instructor, and if approved, under no circumstance are recordings—visual or verbal—to be posted on a public website.
* During class, open laptops distract their owners and those seated nearby. Laptops should not be used for non-class related activities such as surfing the web or watching movies during class. Please keep laptops closed and consider leaving the room if you find that you need to use your laptop for a purpose other than taking class notes. It is disrespectful and unprofessional to use these devices inappropriately during class.
* Late Assignments are unacceptable unless prearranged with instructor.
* Tardiness
* No food or drink of any kind is allowed in labs.

Presentation is important. Your attention to detail, demeanor, and attire factor into how you are perceived as a professional. Active participation in class discussions and critiques is an essential part of learning. Without participating and expressing opinions and thoughts, it is impossible to clarify your goals and develop a personal style.

**Disability Accommodations**

If you qualify for accommodation under the American Disabilities Act, please contact Student Success in Nethery Hall 100 ([disabilities@andrews.edu](mailto:disabilities@andrews.edu) or 269-471-6096) as soon as possible so that accommodations can be arranged. Please also notify the instructor of any necessary accommodations.

**Examinations**

“Credit is not granted in courses unless the required examinations are completed by the student. Students are expected to follow the published examination schedule. In cases where the schedule requires a student to complete four exams in one day, arrangements may be made with the dean to complete one of the examinations at another time”. *AU Bulletin*

**Class Attendance**

“Regular attendance at all classes, laboratories and other academic appointments is required for each student. Faculty members are expected to keep regular attendance records. The syllabus notifies students of the attendance requirements.” *AU Bulletin*

**Teacher Tardiness**

“Teachers have the responsibility of getting to class on time. If a teacher is detained and will be late, the teacher must send a message to the class with directions. If after 10 minutes no message has been received, students may leave without penalty. If teacher tardiness persists, students have the right to notify the department chair, or if the teacher is the department chair, to notify the dean”. *AU Bulletin*

**Class Absences**

“Whenever the number of absences exceeds 20% (10% for graduate classes) of the total course appointments, the teacher may give a failing grade. Merely being absent from campus does not exempt the student from this policy. Absences recorded because of late registration, suspension, and early/late vacation leaves are not excused. The class work missed may be made up only if the teacher allows. Three tardies are equal to one absence.

Registered students are considered class members until they file a Change of Registration form in the Office of Academic records”. *AU Bulletin*

**Excused Absences**

“Excuses for absences due to illness are granted by the teacher. Proof of illness is required. Residence hall students are required to see a nurse on the first day of any illness which interferes with class attendance. Non-residence hall students should show written verification of illness obtained from their own physician. Excuses for absences not due to illness are issued directly to the dean’s office. Excused absences do not remove the student’s responsibility to complete all requirements of a course. Class work is made up by permission of the teacher”. *AU Bulletin*

**Laboratory session**

Students will work on their experiments in groups of two or three. These groups will be arranged the first day of classes.

* Student tardiness: the limit for late attendance in the laboratory sessions is 10 minutes. The group can decide to start the experiment without the late student until he/she arrives. If the late member is late more than 10 minutes, the group will proceed without the late student or can choose to join another group (in the case that there is only one on-time member).
* Prelabs and report submission: the prelabs and reports submission will be made through LearningHub. If LearningHub fails to function, an alternative way will be specified by the instructor and communicated by email.
* The deadline for lab report submission is midnight of the lab day although it is preferable to submit labs prior to the end of the lab period.
* Late report submission: any late report submission must be sent to the instructor and will have deductions of 20% in the final grade. The deadline for late submission is 48 hours after the deadline of the on time submission. If for any reason, the deadline for on time submission is postponed, the 48 hours rule for late submission will also be applied. Lab reports submitted more than 48h after the deadline for submission will not be accepted, meaning, a late submission can be made during 48h after the deadline for on time submission.
* Late reports files must be submitted to the instructor as \*.doc,\*.docx or in pdf. Google drive submissions will not be accepted.
* If the student has an “excused absence”, a makeup lab will be scheduled. Please, contact the instructor and send to him/her the absence excuse by email.
* Grades: the students will have 3 (three) days to complain and/or seek clarification regarding their grades on the lab reports, counting from the day that the grade was made available. After 3 (three) days the grades will not be changed.

**Small Group Learning (SGL)**

The structure of SGL and laboratory sessions share the same guidelines. The students will work in their SGL assignments in groups of two or three students, to be arranged in the first day of classes.

* Student tardiness: the limit for late attendance in the SGL sessions is 10 minutes. The group can decide to start the assignment without the late student until he/she arrives. If the late member is late more than 10 minutes, the group will proceed without the late student or can choose to join another group (in the case that there is only one on time member).
* If the student has an “absence excuse”, a makeup SGL makeup will be scheduled. Please, contact the instructor and send to him/her the absence excuse by email.

**Academic Integrity**

University learning thrives on the rigor of individual investigation, the authentic exchange of ideas, and a corporate commitment to integrity and mutual respect. University learning requires all members of the academic community to behave honestly. Andrews University anchors its practices in the teachings of the Bible as well as in widely established and honorable academic traditions. As the apostle Paul calls us to authenticity in our Christian walk, so the educational institution demands of its participants true and accurate self-representation. In Ephesians, Paul invites believers “to be renewed in the spirit of your minds, and to clothe yourselves with the new self, created according to the likeness of God in true righteousness and holiness” (Eph. 4:23-24, NRSV). As scholars and as Christ servants, we build His living body through our honesty in all things, both small and great. To that end, Andrews University’s faculty and students pledge to learn and grow together, committing to the following Standards and affirming honesty as a core component of an Andrews University education.

Section 1: Standards for Faculty

Because academic integrity grows out of a partnership between faculty, staff involved in academic endeavors, and students, faculty members of Andrews University promise to:

* 1. Model academic integrity both in the classroom and in the course of research activities and

publication.

* 1. Cultivate academic honesty in each course, using the following means as deemed appropriate:
     1. Make the Academic Integrity Policy available to students.
     2. Communicate clearly in the syllabus the expectations of the course, including what academic integrity means within the context of the course.
     3. Explain acceptable source citation practices within the specific course or discipline.
     4. Encourage use of campus learning resource.
  2. Intervene when academic integrity is breached and report intentional violations.

Section 2: Standards for Students

The Andrews University faculty pledge to promote classroom experiences that foster academic integrity. In the same way, students commit to do their part to build a community of honesty. Students promise to:

* 1. Present assignments, lab reports, and research findings that are not falsified in any way.
  2. Respect copyrighted and/or licensed material (whether it be directly quoted or paraphrased)

by citing print or electronic sources as appropriate.

* 1. Follow the source citation guidelines outlined by the course professor.
  2. Submit work that is solely created by the person to whom it is assigned.
  3. Contribute equitably when participating group-work.
  4. Prepare for quizzes and examinations by study and review without stealing, accepting, or using unauthorized quizzes or examination materials.
  5. Follow the professor’s instructions regarding allowable aids during a quiz or examination.
  6. Complete quizzes and tests without seeking answers from or sharing answers with other

students or unauthorized sources.

* 1. Encourage others to high standards of integrity by refusing to assist in acts of academic

dishonesty.

**Emergency Protocol**

Andrews University takes the safety of its student seriously. Signs identifying emergency protocol are posted throughout buildings. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting that specific location. It is important that you follow these instructions and stay with your instructor during any evacuation or sheltering emergency.

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# 11 Assessment rubrics

**Laboratory Rubric**

**Phase I: General Experiment (15 points)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0 points** | **1 point** | **2 points** | **3 points** | **Points Awarded** |
| **Title, Partner, Names, Date** | Not present | incomplete | complete |  | **\_\_\_/2** |
| **Plan: Equipment List, Hypothesis (predictions), Description of Plan** | No evidence of planning before experiment | Equipment List, Hypothesis or Description of Plan missing | Equipment List, Hypothesis and Description of Plan present |  | **\_\_\_ /2** |
| **Action: Labeled Equipment Picture, Description of techniques and use of equipment** | No documented experimental procedure or picture | Labeled Equipment Picture present, no description of techniques | Labeled Equipment Picture present, incomplete description of techniques | Complete description of experimental techniques with Labeled Equipment Picture | **\_\_\_/3** |
| **Results: measurement values with units, possible tables of values, pictures of phenomenon** | No quantifiable or pictured results | Reported results but far from expectations without explanation | Results make sense or all results far from expected are explained |  | **\_\_\_/2** |
| **Analysis: Graphical, quantitative comparisons, error analysis** | No analysis present | Faulty graphs, no curve fits, many missing calculations or error analysis | Slight error in graphs, curve fitting, calculations or error analysis | Analysis all in order | **\_\_\_/3** |
| **Conclusion:** | No concluding thoughts | Results just compared with expectations | Results compared with expectations, error discussed | Results compared with expectations, error discussed and future investigations/ improvements discussed | **\_\_\_/3** |

**Phase I Total: \_\_\_\_/15**

**Phase II: Exploratory Experiment (13 points)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0 points** | **1 point** | **2 points** | **3 points** | **Points Awarded** |
| **Plan: Equipment List, Hypothesis (predictions), Outline of Experimental Plan** | No evidence of planning before experiment | Equipment List, Hypothesis or Description of Plan missing | Equipment List, Hypothesis and Description of Plan present |  | **\_\_\_ /2** |
| **Action: Labeled Equipment Picture, Commentary on techniques and use of equipment** | No documented experimental procedure or picture | Labeled Equipment Picture present, no description of techniques | Labeled Equipment Picture present, incomplete description of techniques | Complete description of experimental techniques with Labeled Equipment Picture | **\_\_\_/3** |
| **Results: measurement values with units, possible tables of values, pictures of phenomenon** | No quantifiable or pictured results | Reported results but far from expectations without explanation | Results make sense or all results far from expected are explained |  | **\_\_\_/2** |
| **Analysis: Graphical, quantitative comparisons, error analysis** | No analysis present | Faulty graphs, no curve fits, many missing calculations or error analysis | Slight error in graphs, curve fitting, calculations or error analysis | Analysis all in order | **\_\_\_/3** |
| **Conclusion:** | No concluding thoughts | Results just compared with expectations | Results compared with expectations, error discussed | Results compared with expectations, error discussed and future investigations/ improvements discussed | **\_\_\_/3** |

**Phase II Total: \_\_\_\_/13**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0 points** | **1 point** | **2 points** | **3 points** | **Points Awarded** |
| **Formatting:**  **Labelling Sections, Photo Signature** | No organization or photo signature | Sections not labeled clearly or photo missing | Sections distinct and photo present |  | **\_\_\_ /2** |

**Creative and innovative Extra Credit Extra: +\_\_\_\_\_\_ (0 – 2)**

Granted for designing your own Phase II experiment or if

you add an element or measurement not described by Phase II

options.

**Lab Total: \_\_\_\_\_\_/30**

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# 12 Credit Hour declaration

**Credit-Hour Definitions**

An undergraduate 4-credit course requires a total of 180 hours for course lectures, laboratory work, reading requirements and written assignments. For this course, the instructor estimates that this total of 180 hours will be distributed in the following activities

* Class Lectures/In-Class Activities:     76 hours
* Labs:                                        30 hours
* SGL Sessions: 37 hours
* Homework/Reading                                        37 hours

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