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**WBUonline**

**School of Mathematics & Sciences**

**UNIVERSITY MISSION STATEMENT**

Wayland Baptist University exists to educate students in an academically challenging, learning-focused and distinctively Christian environment for professional success and service to God and humankind.

# COURSE NUMBER & NAME:

PHYS 1403 VC01 Physics for Educators

## TERM:

Fall 1 2022

## INSTRUCTOR:

Dr. Elise Adamson

## CONTACT INFORMATION:

Office phone: 806-291-1129

WBU Email: adamsone@wbu.edu

**ALL** emails submitted to me **MUST** contain **PHYS1403** in the subject line. If you do not include this in the subject line, you **may not** receive a response!!

A WBU email account is one of the requirements for this class. ALL class correspondence MUST be sent using the email account provided to all students by the university (either @wbu.edu or @wayland.wbu.edu). Emails sent through other accounts may NOT receive a response. Also, information required to access class material, will be sent only to the WBU email account.

## OFFICE HOURS, BUILDING & LOCATION:

Mon 8:00-11:00am, 1:00-3:00 pm CDT

Wed 8:00-11:00 am

Room 123 Moody Science Building, Plainview campus. 806-291-1129

Mail: WBU 1900 W 7th ST, CMB #1301, Plainview, TX 79072

## COURSE MEETING TIME & LOCATION:

Online, asynchronous. Weekly tasks generally due the following Monday by midnight, but Discussion Board may be due on Saturday. Quizzes are due Monday night by midnight.

## CATALOG DESCRIPTION:

designed for the student seeking to be an elementary teacher. Emphasis on simple machines, forces and motion, electricity, magnetism, sound, light, and thermodynamics, development of grade-level, hands-on exercises for students.

## PREREQUISITE:

## [MATH 1304](http://catalog.wbu.edu/content.php?catoid=3&catoid=3&navoid=86&filter%5Bitem_type%5D=3&filter%5Bonly_active%5D=1&filter%5B3%5D=1&filter%5Bcpage%5D=10#tt7990)  and declared major of BSIS or BAS degree.

The College Algebra requirement refers to the ability to work with formulas, as this is necessary to do well.

## REQUIRED TEXTBOOK AND RESOURCE MATERIAL:

**Conceptual Physics 13th edition, Paul Hewitt**, **with Modified Mastering**- this is an e-text, with online homework, included in WBU fees through Inclusive access using VitalSource. ISBN 9780135746370

Just be sure you read the text- the typed notes and videos don’t cover everything, you are expected to do the readings, too.

Also required**:** scientific calculator, internet access, cell phone camera, and these specific materials: 3 deflated standard balloons, hot & cold water, pennies, cups/bowls, spoons: metal, plastic and wooden( or a wooden craft stick), ruler (with a pencil groove), string, tape, marbles, battery (6V preferred), insulated wire, shoebox or similar, mirror, protractor, laser pointer (cheap), butter, baking chocolate square, large nails or bolt, metal paperclips, rubber bands (3 types), 2 L bottle w/ lid (or smaller disposable water bottle), soy sauce packet or pipette/dropper, corn starch OR borax and white glue. If you do not have some of these materials, please check with me before buying them- for some we can adapt other items. **You must do the Materials Inventory by Wed of Week 1**, so I know what you still need. This will document you participation in the course- otherwise, you will be reported as a “No-Show”

**Proctor required** for final. If online testing is required, **webcam** required to allow online proctoring AND you must schedule a mutually agreeable time with Dr. Adamson (testing over ZOOM)

## COURSE OUTCOMES AND COMPETENCIES:

## Students will be able to:

1. Take written information, translate it into equations, and solve for requested quantity.
2. Explain and apply conservation laws and energy transformations to situations.
3. Demonstrate an understanding of the history and development of physics
4. Identify and correct common misconceptions about physics principles.

## ATTENDANCE REQUIREMENTS:

Any student who misses 25 percent or more of the regularly scheduled class meetings may receive a grade of F in the course. Additional attendance policies for each course, as defined by the instructor in the course syllabus, are considered a part of the University’s attendance policy. Attendance in an online course is determined by participation in activities, not just logging into Blackboard. Any student who fails to complete activities for 3 weeks, or who does not complete the required assignment during week 1, may be dropped.

## STATEMENT ON PLAGIARISM & ACADEMIC DISHONESTY:

Wayland Baptist University observes a zero tolerance policy regarding academic dishonesty. Per university policy as described in the academic catalog, all cases of academic dishonesty will be reported and second offenses will result in suspension from the university.

## DISABILITY STATEMENT:

In compliance with the Americans with Disabilities Act of 1990 (ADA), it is the policy of Wayland Baptist University that no otherwise qualified person with a disability be excluded from participation in, be denied the benefits of, or be subject to discrimination under any educational program or activity in the university. The Coordinator of Counseling Services serves as the coordinator of students with a disability and should be contacted concerning accommodation requests at (806) 291-3765. Documentation of a disability must accompany any request for accommodations.

## COURSE REQUIREMENTS and GRADING CRITERIA:

Generally, each week will include

* **chapters** to read from the text (four to five each week)
* **notes** for each chapter -you can choose to just read the book and not the notes, but be sure to check for additional content such as simple machines (week 2) and space exploration (week 3)
* **videos** to watch, usually no more than an hour or two per week (some are 3-5 min long, others up to 20 min or so). Some videos are from outside sources, some I have recorded, and some are about specific demos or experiments.
* an **assignment in Modified Mastering Physics** (graded)(online homework system) by noon Monday of following week
* two to four **lab activities** (some virtual, some physical) (graded) by noon Monday

(following week)

* a **Discussion Board** prompt (graded) due by Saturday(if peer response required) or noon Monday
* **weekly quiz** in Blackboard (graded and timed) by midnight Monday

There is also one **proctored comprehensive final exam (likely in-person)**, and **three projects** (due 8/22, 9/6, 9/19).

Weekly assignments will be due on **Mondays at midnight**, CDT, except Discussion Board may require a post by midnight Saturday, if peer comments are required.

In addition, there will be a **proctored final**, and **three projects** (fairly easy, due midnight Monday). **Please try to complete the week’s activities by Sunday night; they’re due on Monday so I can reply to any problems from the weekend.**

Final exam (proctored, in person, 1 hour) 25% 90-100----A

Homework- mostly Modified Mastering 22% 80-89-----B

 Discussion board 10% 70-79-----C

 3 projects 18% 60-69-----D

 Labs 10% below 60—F

 Quizzes (open book, but timed, 45 min) 15%

### Final Exam:

The final exam requires a proctor approved by WBUonline. Proctor approval should be done at least 3 weeks before final- see link “Proctor Request” in Blackboard. If you are taking the test at a WBU campus, you do not need to get proctor approval, but you need to schedule in advance **with your proctor**. Either the proctor must have a computer for you to use, or you can bring a laptop- either must be able to connect to our Blackboard course. The approved proctor will be given access to a website to get the access code, then the proctor will give you the code to log in to the test, taken in the Blackboard course. There will be a one-hour time limit on the test**. An in-person proctor is preferred**. If remote online proctoring is required for the final, it must be requested **no later than week 4**. By this point, you need to decide how you plan to take the test. To possibly do remote online proctoring without a face-to-face proctor, you must have a **computer, good internet connection**, and use a **phone** for ZOOM proctoring while looking at the questions on your **computer** screen (prop phone to observe you and surroundings). Online proctoring is possible ONLY if we work out a mutually agreeable time for ZOOM call with Dr. Adamson, who will observe you taking the test. This option depends on scheduling availability. Note that review questions and solutions are available in Blackboard- please be sure to try this as a practice test before taking the final exam.

*Quizzes:*

Each week’s material will be followed by a quiz in Blackboard. It will be due no later than Monday at midnight, CDT. (The quiz over Week 1 is due on Monday of Week 2, etc.). The quizzes are open-book, open-note, but are timed, with a 45 minute time limit.

### Homework**:**

Homework primarily consists of assignments in **Modified Mastering Physics**, but additional work may be assigned as the course progresses. There will be one assignment each week, over all the chapters covered that week. Homework problems may be repeated until the due date, but expect that each repeated attempt of a problem will decrease the maximum possible grade by 5% of the points for the problem. If you attempt a question 3 or 4 times and still don’t understand, you can email me for hints or an explanation BEFORE you give up (unless it is too late in the assignment window. I check email less frequently on weekends, so start early if you want help). Due by **Monday at** **midnight** (CDT). (Week 1 homework is due by midnight on Monday of Week 2, etc.)

### Discussion Board:

Each week there will be a topic for discussion or response. If that week’s post requires peer response, an initial post will be due by **midnight Saturday CDT**, to allow time for peers to respond by **Monday night**.

### Projects**:**

One topic in physics that usually interests elementary students is space, so the projects are about astronauts, the space program, and real or fictional space travel. These should be enjoyable and build your background knowledge in this area. You choose your 3 topics from 6 possibilities. (Three of the options are books or movies.) See the Project instructions at the end of this syllabus. Each project counts equally. A project is due every two weeks (due on Mndays of weeks 3, 5, and 7). Any project submitted late will lose 15 points per day.

### Labs:

Each week will have two to four labs, either virtual, or ones you do with simple materials. By Wed of week 1, you must let me know if you cannot obtain some of the materials on the list. If you have a problem with performing a lab, let me know ASAP, we may be able to find an alternate lab. Labs will generally require some sort of report or response, which will depend on the specific lab, and will be uploaded as an assignment in that Week’s folder.

**Grade Appeal Statement**: “Students shall have protection through orderly procedures against prejudices or capricious academic evaluation. A student who believes that he or she has not been held to realistic academic standards, just evaluation procedures, or appropriate grading, may appeal the final grade given in the course by using the student grade appeal process described in the Academic Catalog. Appeals may not be made for advanced placement examinations or course bypass examinations. Appeals are limited to the final course grade, which may be upheld, raised, or lowered at any stage of the appeal process. Any recommendation to lower a course grade must be submitted through the Vice President of Academic Affairs/Faculty Assembly Grade Appeals Committee for review and approval. The Faculty Assembly Grade Appeals Committee may instruct that the course grade be upheld, raised, or lowered to a more proper evaluation.”

## TENTATIVE SCHEDULE

Week 1

 Materials Inventory- due by Wed of week 1- must include mailing address

Lab Safety Contract- MUST be completed before any labs are done, without this, all labs are zeros

About science

 Newton’s First Law

 Linear motion,

 Newton’s Second Law

 Newton’s Third law

 Discussion Board- introduce yourself

 Week 1 homework, labs & quiz

Week 2

 Momentum

 Energy

 Simple Machines

Vibrations and Waves

 Sound

 Discussion Board

 Week 2 homework, labs & quiz

Week 3 Project 1 due Monday

Rotation

Gravity

 Projectile and Satellite Motion

Space science

 Discussion Board

Week 3 homework, labs & quiz

Week 4

 Atomic Nature of Matter

Solids

 Liquids

 Gases

 Discussion Board

 Week 4 homework, labs & quiz

Week 5 -Project 2 due Tuesday (Monday is Labor Day)

Temperature, Heat and expansion

Heat Transfer

Change of Phase

Thermodynamics

Discussion Board

Week 5 homework, labs & quiz

Week 6

Electrostatics

 Electric Current

 Magnetism

Electromagnetic Induction

Discussion Board

Week 6 homework, labs & quiz

Week 7 Project 3 due Monday

 Properties of Light

 Color

 Reflection and Refraction

Light Waves

 Light Emission

 Discussion Board

 Week 7 homework, labs & quiz

Week 8- exam available Monday-Saturday ***proctored final- comprehensive***

Syllabus revised 6/9/22, subject to change if needed

# PHYS 1403 Projects Fall 1 2022

A project is due every two weeks. These are due on the Mondays of weeks 3, 5 and 7. You may choose 3 of the 6 available projects, but the order of the projects is up to you. Projects account for 18% of the course grade. These are all individual projects, not group projects. Pay attention to length requirements

Motivation: As part of becoming an elementary teacher, you need to know the historical context of different subjects. For many kids, the most exciting topics in science are dinosaurs and space. Dinosaurs are more appropriately addressed as biology or geology, but space and space travel are well within the realm of physics. As this topic is not specifically covered in out text, all of the projects for this course will be about astronauts and space. I do have some of this content in the week 3 notes.

For EACH project, **be sure you cite your sources**. Do not directly copy, but write information in your own words. If all of your information is from the specific single book or movie, you can state that, but any outside sources must be cited. You must document where your images come from, too. For any project, I MAY choose to quiz you over what you have learned, or require that you discuss the topic with me. It should be clear which part of your project comes from which source (either use footnotes or in-text references, or give sources by slide number or on each slide- you may use any reasonable format to cite sources). Do not copy someone else’s paper or PowerPoint- this is grounds for failing course, and being reported to administration for cheating. Do not copy your own work for another course, unless you have discussed this with me and have permission.

For each project, create a **PowerPoint presentation** or type **a three- to five page paper**. Other than the book/movie/museum reports, you must use **at least** three reputable sources. Graded on quality and quantity of content, as well as form. **Minimums given refer to acceptable grade (85)**, to get a higher grade, include more (pages/slides/sources/concepts). For a typed paper, content must be **double spaced**, with only a single line for title, followed by your name. Font must be no larger than 12 point in size. Any PowerPoint project **must have a minimum of 10 slides** (may need more to cover topic). Note: I have a particular annoyance when the words “shuttle” and “space capsule/ space ship” are used incorrectly- be sure which type of vehicle you are describing.

1. **Space Race**- Explain what was meant by “the space race”- what caused the race, who was involved, what was the goal…? Explain the purpose and crew requirements for the four American manned projects (Mercury, Gemini, Apollo and Space Shuttle). What was considered to be the “end” of the space race, and how has that competition mentality about space changed? List the major accomplishment milestones and tragedies, and which country (and person achieved them) (first object shot into space, what animals went into space, first person in space, first person to orbit earth, first death in space, first space docking, first manned mission to orbit Moon, first space station, first to land on the Moon, etc.) This project generally describes space exploration programs from the 1950s through about 2009.
2. ***Hidden Figures*** (based on real life) Watch the movie or read the book: *Hidden Figures*, and describe what you learn or feel. What can this movie teach us about history (about segregation, racial attitudes, women, the space program or history of computers)? You don’t have to address all of these, but probably will include more than one, though you can also address other related issues.
3. **Space vehicles**: Explain the different types of space vehicles: those used just for cargo, and manned vehicles (you may not have much info for other countries, but at least the types of American rockets & capsules, and what followed-Mercury, Gemini, Apollo, shuttle, current.) Which vehicles have suffered catastrophic failure resulting In deaths (and the cause of that failure). Describe current vehicles used to ferry astronauts to the ISS, and what vehicles are in testing or planning phases. Discuss the private companies now building or sending ships into space.
4. **Apollo 13**: (based on real life, some characters/situations edited) Watch or read *Apollo 13* (Original book title was *Lost Moon*) and respond. Possible things to address: what did you learn, what surprised you, how was physics used? What problems occurred, and how were they resolved? How was this mission described later (by a two-word oxymoron)? You **may** supplement what you see/read with other sources. Do not limit yourself to answering these specific questions, the list is to help you generate ideas.
5. ***The Martian***(Fiction)- read the book or watch the movie- NOTE: there is very explicit language which is not acceptable in class nor in your report (repeated use of a four-letter word). It is not gratuitous, but reflects the attitude of the main character in certain situations. If you will be offended by this, do not choose this project. Possible items to discuss/demonstrate: what are the main character’s obstacles, and how does he overcome each of them (if he does)? Does this scenario seem possible? Is there any reference to actual missions to Mars? What realities of space travel or life on another planet does this movie/book make much more apparent to you? **In addition to answering these types of questions, also discuss your personal response** to what you observe. The list of questions is only to give you suggestions- please discuss the issues you observe.
6. **Journey to Mars**: how have humans actually explored/studied Mars (what spacecraft/rovers, etc.) Have there been failures in the missions to Mars, or unexpected successes? What obstacles exist for human travel to Mars? How much time does it take to get there? Can the surface support human life? Are there current plans to further explore Mars? (**Address all of these questions at a minimum**, and you can give more info)

Revised 6/9/22