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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:

Summer, 2020

## 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:

No set office hours for online course, contact me to schedule a visit. Room 123 Moody Science Building, Plainview campus. Mail: WBU 1900 W 7th ST, CMB #1301, Plainview, TX 79072

## COURSE MEETING TIME & LOCATION:

online

## 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, Paul Hewitt**, Addison Wesley;(black cover, shows International Space Station)

Edition: 11, ISBN 978-0-321-78795-8 (older edition is acceptable- content may be in different order, check chapter titles)

**Sapling Learning online one-term access**.This should automatically be available through course in Blackboard, as part of Inclusive Access. You may choose to opt out and pay for access on your own, but it will probably cost more this way.

Note: I have chosen a slightly older textbook, so you can find less expensive used copies, but you MUST HAVE the Sapling Learning access code <https://www.saplinglearning.com/ibiscms/login/> This is the Sapling Learning website at MacMillan Publishing- this is available in Blackboard, do not purchase separately. It is automatically charged to your WBU account, like tuition.

Also required**: scientific calculator**, internet access, and basic materials generally found at home for do-it-yourself labs. If you do not have some material, you can improvise, or contact me for other options.

**Proctor required** for final. If online testing is required, **webcam** required to allow online proctoring

## 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 is an online course is determined by participation in activities, not just logging into Blackboard. Any student who fails to complete activities for 3 weeks 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
* my written **notes** for each chapter
* **videos** to watch, usually no more than 30-45 min per week (most are 3-5 min long)
* an **assignment in Sapling Learning** (graded)(online homework system)
* one to three **lab activities** (some virtual, some physical) (graded)
* a **Discussion Board** prompt (graded)

Weekly assignments will be due on Mondays at noon, CDT, except Discussion Board may require a post by midnight Saturday, if peer comments are required- see each week’s assignment.

In addition, there will be **two non-proctored exams**, a **proctored final**, **Scientist report** (3 pages), and **four projects** (fairly easy).

Tests (includes final exam) 40% 90-100----A

Homework- online 20% 80-89-----B

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

 4 projects & scientist report 20% 60-69-----D

 Labs 10% below 60—F

### Tests**:**

The final exam requires a proctor approved by WBUonline. Proctor approval should be done 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 do need to schedule in advance with your proctor. There will be a one-hour time limit on each test. If we are still under “stay-at-home” orders, the final will require a webcam for online proctoring, otherwise, please take it with an in-person proctor.

### Homework**:**

Homework is primarily made of assignments in Sapling Learning, but additional work may be assigned as the course progresses. Sapling requires a purchase in addition to the textbook. There will be one assignment each week, over all the chapters covered that week. Homework may be repeated until the due date, but each repeated attempt of a problem will decrease the maximum possible grade by 5% of the points for the problem. The expectation is for homework grades to be in the 80s-100, as the system provides feedback for incorrect responses.

### Discussion Board:

each week there will be a topic to discuss or respond to. As noted above, 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 at noon.

### Projects and Scientist report**:**

There will be one scientist report over the life and work of a scientist- selection of scientist will be done as an entry in Discussion Board, and in addition to the 3-page report, each student will give a brief summary in Discussion Board. The topic selection falls in week 2, and the report and summary are due in week 8. Specific requirements will be listed in the week 2 information. Report length is 3 pages.

One topic in physics that usually interests elementary students is space travel, so several of 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 4 topics from 8 possibilities. (Three of the options are books or movies.) See the Project instruction sheet. Each project and the scientist report count equally. A Project is due every two weeks (after weeks 2, 4, 6, and 8).

### Labs:

Each week will have one to three labs, either virtual, or ones you do with simple materials. If you have a problem with performing the lab, let me know ASAP. Labs will generally require some sort of report, which will depend on the specific lab.

**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.”

## ADDITIONAL INFORMATION

If you must login OUTSIDE of our Blackboard course, here are Sapling Learning instructions:

* Under Enroll in a new course (at Sapling website), you should see Courses at Wayland Baptist University. Click to expand this list and see courses arranged by subject. Click on a subject to see the terms that courses are available.
* Click on the term to expand the menu further (note that Semester 1 refers to the first course in a sequence and not necessarily the first term of the school year).
* Once the menus are fully expanded, you’ll see a link to a specific course. If this is indeed the course you’d like to register for, click the link.
* Review the [system requirements](http://community.macmillan.com/docs/DOC-8042-what-are-the-minimum-system-requirements-for-your-media#Sapling) and confirm that Flash is updated and enabled in your browser.

## TENTATIVE SCHEDULE

Week 1

 About science

 Newton’s First Law

Week 2

 Linear motion,

 Newton’s Second Law

 Newton’s Third law

 **Project 1 due start of week 3**

Week 3

 Momentum

 Energy

 Simple Machines

Week 4

Gravity

 Projectile and Satellite Motion

**Project 2 due start of week 5**

Week 5

 **Exam 1**

 Solids

 Liquids

 Gases

Week 6

Temperature, Heat and expansion

Heat Transfer

Change of Phase

**Project 3 due start of week 7**

Week 7

 Thermodynamics

 Vibrations and Waves

 Sound

Week 8

 ***Scientist report due***

 **Exam 2**

Electrostatics

 Electric Current

 Magnetism

**Project 4 due start of week 9**

Week 9

 Electromagnetic Induction

 Properties of Light

 Color

Week 10

 Reflection and Refraction

Light Waves

 Light Emission

Week 11- ***proctored final***

 Syllabus revised 4/16/20

# PHYS 1403 Outline- Summer 2020

## Longer term option

This is the last term when the course is offered for 11 weeks- starting with fall 2020, the online class will only be 8 weeks long, but still cover the same material, so the pace will be faster.

## Purpose & Skills Required

This course is intended to explain physics concepts necessary to teach elementary school science. You will need basic algebra skills (be able to solve for a variable and plug into equations), but more homework and test questions are conceptual than computational.

Sample computational problem:

 If V = 12 and I = 2, what is R, if V = IR? (Answer is R = 6, units will be covered as needed)

Topics covered include motion (speed, distance, velocity, acceleration, free fall, etc.), forces and Newton’s laws, gravity, heat, waves, sound, light, electricity & magnetism. Final exam will be proctored.

## Textbook, Homework and Other Assignments

The textbook is the most popular conceptual physics book in the country. I suggest an older edition, and you can use whichever edition of Paul Hewitt’s book that you can find. The homework problems are not from the book, but rather from Sapling Learning, an online homework system. The problems are of the same type for each student, but the computer provides different numbers to each student for most problems. (Those about the size of the Earth or charge on an electron have REAL numbers, not changed for different students.)

I try to use multiple learning styles, so projects are usually PowerPoints or essay-style, but may include photos as part of description. You get to choose which projects to do- do 4 form 8 possible projects- or if you have a good idea for a different type of project, just check with me. Some are to watch a movie (Apollo 13, hidden figures, the Martian) and report on the concepts/ideas included, others are more of historical timelines of physics or space exploration, etc. Or even reporting on a trip to a kid’s science museum.

The labs are either done with objects around the house or easily (& cheaply) obtained, or make use of online simulations

## Class Philosophy

I want the class to help each other- this is NOT a competitive situation. I have taught most of the sections offered since the course was created, and most students can earn an A or B, even without much of a science background. Just participate and actually **do** the work requested. We have a list of activities at the start of each week. I am fairly flexible, and work to accommodate situations as needed.

I look forward to helping you learn the science content you need, and how to show kids these ideas. Please join us!

Elise Adamson, Ph. D. adamsone@wbu.edu ****