# PHYSICAL SCIENCE PHSC1001 (Lab)

Spring 2021

**Class Time and Location**: T 9:30 – 9:20 AM, Room: **S235 and S229**
**Instructor**: Gaumani Gyanwali – Ph.D.: OSU-Stillwater; MS, BS: Tribhuvan University
**Office Location: S244** (Mena Campus)
**Office Hours:** Posted on the office door
**Contact Information:** Office: (479)-394-7622, Ext. 1339
Cell: (479)-234-8727 Email: gyanwali@uarichmountain.edu

**Prerequisite**: A grade of "C" or better in Elementary Algebra.

**Resources**:

Laboratory Manual: Physical Science Lab Manual, Gaumani Gyanwali, 2016, UA Rich Mountain (Revised: December 2019)

Required Materials:
**1.** Lab safety goggles
**2.** Calculator capable of roots and exponents
**3.** Laboratory manual mentioned above.

**Face Mask Policy:** As per the Executive Order from the governor of Arkansas, all students are required to wear a proper face covering that completely covers the nose and mouth while on campus and in class. Masks with holes or masks that do not completely cover nose and mouth are not acceptable. Any student that does not have a proper mask will leave class and be referred to the Vice Chancellor for Student Affairs for possible disciplinary action.

**Food and Drink:** Food and drinks, including water are not allowed in the lab at any time.

**Course Description**: This is a general education course designed to meet the need of a laboratory science course for education and other non-science majors. This introductory level course includes the laboratory experiments from the fields of chemistry, physics, and/or astronomy.

**Program Outcomes:** Students will increase their
-writing, reading, speaking, and listening skills,
-competency in mathematics, utilizing their analytical and occupational skills to solve real life problems,
-understanding of different cultures and societies across the globe and how both have changed over time,
-understanding of basic principles and their application in the field of physical sciences and biological sciences, and
-technological and research skills.

**Rationale:** In this technological age and the age of science. It is imperative that people have a basic understanding of the scientific methods and technologies they are using in their daily lives. By using a conceptually based hands-on approach, students will quiet their fears of science and gain knowledge and appreciation for this omnipresent discipline.

**Course Objectives:** Upon successful completion of PHSC1001, the student should be able to

1. Carry out metric measurement of dimension, mass, volume, and temperature of regular and irregular solids, liquids, and compute volume and density based on those measurements.
2. Record motion data from motion sensors and gates to carry out computation and graphing of distance, velocity, acceleration and time to measure average speed and acceleration due to gravity
3. To set up heating plates and burners to carry out calorimetric measurements on metals, water, oil, and food samples.
4. To carry out measurement of speed of sound and touch tones frequencies.
5. To understand and distinguish the chemical properties and composition of chemical compounds, analyze the percentage composition, and ionic composition of salts.
6. Develop problem-solving skills for simple mathematical calculations of practical application.
   (Components: collaboration, data collection, calculation and formulation, communication: proper grammar and style, documentation, logical argument, research skills)

**Tentative Schedule for Lab:**

| Date | Experiments | Page/Miscellaneous info |
|---|---|---|
| 1/12 | Syllabus and Safety: Safety Agreement | |
| 1/19 | 1. Measurement | 5 |
| 1/26 | 2. Back and Forth Motion | 19 |
| 2/2 | 3. Value of Acceleration due to Gravity | 35 |
| 2/9 | 4. Specific Heat of Metals | 43 |
| 2/16 | 5. Heating and Cooling Rates | 53 |
| 2/23 | 6. Sound Frequency and Speed | 63 |
| 3/2 | Make-up *(needs a week's notice)* | One missed lab from 1-6 |
| 3/9 | 7. Caloric Values of Food | 73 |
| 3/16 | 8. Spectrometric Identification of Salt Solutions | 83 |
| *3/23* | *Spring Break – no lab* | |
| 3/30 | 9. Composition of a Metal Oxide | 93 |
| 4/6 | 10 Types of Chemical Reactions | 101 |
| 4/13 | 11. Composition of a Penny | 111 |
| 4/20 | Make-up *(needs a week's notice)* | One missed lab from 7-11 |

**Course Conduct: Course Conduct:** The lab will be performed once a week on Tuesdays 9:30-11:30 AM and a laboratory manual is provided as a guide to perform designated experiments. The data must be collected properly following the guided principles and scientific techniques mentioned in the manual. There are three steps to properly performing an experiment and completing a laboratory report.

1. Study the Introduction section in the lab manual for that experiment. Complete the Pre-laboratory Questions before coming to the lab.
2. Perform the experiment or several experiments in that chapter and fill up the data page as well as answer all the given questions.

3. Prepare a formal laboratory report following the guideline given at the end of the lab manual and following the format mentioned. Submit the completed lab report the next lab period (usually 1 week later).

**UA Rich Mountain Credit Hour Calculator:** For every course credit hour, you should expect to spend at least three clock hours per week of concentrated attention on the course-related work. This is including but not limited to time attending class, as well as out-of-class time spent completing homework, seeking help from instructor or tutors, preparing for upcoming assignments/tests/exam, reviewing material, problem solving, and organizing your notebook. For a four-hour course, a typical student should expect to spend at least twelve hours per week. Please see credit hour calculator attached to end of syllabus.

**Course Requirements/Evaluation (Grading):**

Your grade for this course comes from the following:

| | | |
|---|---|---|
| 11 Lab reports @ 20 each | = 200 | (lowest one dropped after submitting all) |
| **Total points possible** | **= 200** | |

The final grade for the course will be determined by dividing the student's total number of points earned by the number of possible points. Grades are assigned based on the following percentage scale, after rounding the calculated percentage to the nearest whole number:

| | |
|---|---|
| 90 -100 | **A** |
| 80 - 89 | **B** |
| 70 - 79 | **C** |
| 60 - 69 | **D** |
| <60 | **F** |

**Class Procedures/Student Requirements**:

On-Campus Resources: A general guideline will be provided to how to perform experiments and how to prepare a laboratory report based on the experiments. You should follow the instructions clearly and completely to get the optimum benefit of not only understanding the objective of the experiments but also to get good grades.

Attendance Policy: You must attend the lab and must complete the experiment yourself. Cannot copy other's data to prepare the lab report.

Assignment Due Dates: Lab reports will be due the next week of the lab period.

Make-up Work Policy**:** Make up work should be competed promptly after the absence when available. You must make up to be able to fill the data pages, use the Pre-lab for grades, and to prepare the lab report.

Cell Phone Policy**:** Do not use your cell phone during the experiment.

Grading:

1. Pre-laboratory questions and the data pages including the questions: 10 points.
2. Laboratory Report: 10 points.

**Academic Dishonesty**: It is expected that each student shall do his/her own work on class works, quizzes, exams, and lab reports. Cheating, copying other's answers, writing other's statement without citing their reference are all considered plagiarism and are penalized from allowing no point in that particular unit up to dismissal from the whole course, depending on the severity of the offense.

**Disability Policy:** It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs accommodations should contact the Vice-Chancellor for Student Affairs Office, 394-7622, ext. 1400.

**Arkansas Clean Air Act**: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

**Student Misconduct**: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire or safety issues, gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

**UA Rich Mountain Mission:** UA Rich Mountain provides transformative education to all learners.

| Credit Hour Requirement Calculator | | | | |
|---|---|---|---|---|
| | | | | |
| **Course Information** | | | | |
| Department, Course Number | PHSC 1003 (Lecture) and PHSC1001 (Lab) | | | |
| Course Title | Physical Science | | | |
| Credit Hours | 3+ 1= 4 | | | |
| Mode of Delivery | Traditional | | | |
| Weeks in Part of Term | 15 | | | |
| Level of Reading Material | Advanced/Scientific/Technical (2) | | | 2 |
| Reading Level of Students | Average Student (2) | | | 2 |
| Average Pages per Hour | 10 | | | |
| | | | | |
| | | *Enter either week or term, not both* | | |
| **Contact Hours** | | **Hours/Week** | **Hours/Term** | **Total Hours** |
| Lecture/Recitation | | | 45 | 45 |
| Lab Contact Hours | | | 24 | 24 |
| | **Pages Asg'd** | **Hours/Week** | **Hours/Term** | |
| **Syllabus Items** | | | | |
| Reading | 360 | | | 36 |
| Assignment | | 1 | | 15 |
| Online Quiz | | 1 | | 15 |
| Researching Lab questions | | 2 | | 30 |
| Reviewing for exams | | | 10 | 10 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | |
| **Total Hours** | | | | 175 |
| **Required Hours** | | | | 150 |
| **Difference** | | | | Ok + 25 |