# PHYSICAL SCIENCE PHSC1003 (Lecture)

Spring 2021

**Class Time and Location**: TR 8:00 – 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**:

Textbook: Physical Science, Tenth Edition by Bill W Tillery: McGraw Hill, 2014 ISBN 978-0-07-351389-8.

Required Materials:
**1.** Calculator capable of roots and exponents
**2.** 2½ inch binder divided into three sections – Class Worksheets, Assignments, Exams.

**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 study of selected materials from the fields of chemistry, physics, and astronomy. This course requires at least one paper using a documentation format and multiple lab reports.

**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 it is imperative that people have a basic understanding of the 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 PHSC1003, the student should be able to-
1. Recognize the influence of physical science on their daily lives. (Components: apply, validate, and differentiate).
2. Explain the philosophy of science: scientific conclusions are based on experimental evidence. (Components: analyze, evaluate, and interpret data)

3. Demonstrate a basic understanding of measurements, mechanics, sound, heat, electricity, atomic structure, chemical bonding, mole concept, and astronomy by explaining the scientific principles used in everyday items.
4. Develop problem-solving skills for simple mathematical calculations of practical application. (Components: analyze mathematical relationships, calculate, comprehend, and differentiate)

**Topical/Unit Outline:**

I. Scientific Method, Measurement and Error
A. Syteme Internationale
B. Conversion Factors
C. Scientific Notation
D. Precision and Accuracy
E. Percentage Error

II. Force and Motion
A. Motion: Speed, Velocity, Acceleration
B. Forces: Horizontal and Vertical Motion
C. Newton's Three Laws of Motion
D. Motion Due to Gravity
E. Weightlessness

III. Work and Energy
A. Work and Power
B. Energy (Potential and Kinetic)
C. Energy conservation and transfer
D. Energy Sources
E. Renewable energies

IV. Heat and Temperature
A. Temperature/Heat
B. Specific Heat Capacity
C. Heat Transfer
D. Change of Phase
E. Laws of Thermodynamics
F. Heat engines

V. Wave Motion/Sound
A. Waves
B. Reflection and Refraction
C. Interference
D. Doppler Effect

VI. Electricity/Magnetism
A. Static Electricity
B. Circuits
C. Ohm's Law
D. Magnets/Electromagnets

E. Electromagnetic Induction
F. Motors/Generators/Transformers

VII. Atomic Structure
A. Structure of an atom
B. Atomic Spectra
C. Electron Configuration
D. Ions and emission of light

VIII. Periodic Table of Elements
A. Groups and Periods
B. Periodic Properties
C. Chemical Bonding: ionic and covalent compounds
D. Naming binary compounds

IX. Chemical Reactions
A. Molecular formula and weights
B. Chemical equations
C Balancing chemical equations
D. Types of chemical reactions
E. Mole concept

X. Astronomy (The Solar System)
A. Planets, moons, and other bodies
B. Small bodies of the solar system
C. Origin of the solar system
D. Ideas about the solar system

**Tentative Schedule for Lecture: Physical Science**

| **Week** | **Topics/Activities by Book Chapter** | **Date/Day** |
|---|---|---|
| 1 | Discuss syllabus; Survey, Pretest<br>Measurement | 1/12 T<br>1/14 R |
| 2 | Measurement<br>Force and Motion | 1/19 T<br>1/21 R |
| 3 | Force and Motion<br>Work and Energy | 1/26 T<br>1/28 R |
| 4 | Work and Energy<br>Review | 2/2 T<br>2/4 R |
| 5 | **Test 1**<br>Heat and Temperature | **2/9 T**<br>2/11 R |
| 6 | Heat and Temperature<br>Wave motion/ Sound | 2/16 T<br>2/18 R |
| 7 | Wave motion/ Sound<br>Electricity and Magnetism | 2/23 T<br>2/25 R |
| 8 | Electricity and Magnetism<br>Review | 3/2 T<br>3/4 R |
| 9 | **Test 2**<br>Atomic Structure | **3/9 T**<br>3/11 R |
| 10 | Atomic Structure | 3/16 T |

| | | |
|---|---|---|
| | Periodic Table of Elements | 3/18 R |
| 11 | Periodic Table of Elements<br>Review | 3/30 T<br>4/1 R |
| 12 | **Test 3**<br>Chemical Reactions | **4/6 T**<br>4/8 R |
| 13 | Chemical Reactions<br>Astronomy | 4/13 T<br>4/15 R |
| 14 | Astronomy<br>Review | 4/20 T<br>4/22 R |
| 15 | **Test 4**<br>Review for finals | **4/27 T**<br>4/29 R |
| 16 | **Final Exam** | **5/4 T** |
| | | |

**Course Conduct:** The class will be taught using a combination of lecture using *Powerpoint* presentation in-class as well as through Zoom video at the same time, solving in-class questions, demonstrations, group interaction and discussions, and performing laboratory experiments. Students are strongly encouraged to discuss concepts and examples as opportunities are provided during instructor presentation. It is the student's responsibility to inform the instructor when a concept is confusing or otherwise unclear. Students must answer all the in-class questions before leaving the classroom and discuss with the instructor about any confusing concept right away.

You are encouraged to solve problems forming a study group and actively taking part in discussion. You may seek assistance from Student Support Services (SSS) to check the concepts in homework assignments, and exam reviews but it is not the responsibility of SSS to teach the entire lesson to complete your homework, neither can you directly ask for the answer. In case of extreme difficulty, you must inform me no later than two weeks after the classes started. You cannot pass the course without completing the online assignments and fully comprehending them. Expect a minimum of 12 hours of work per week in this course.

**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:

| | |
|---|---|
| Four quarterly tests @100 each | = 300 (lowest one dropped when taken all four) |
| One Final Exam @ 100 | = 100 |
| 10 Online Assignments @ 20 each | = 200 |
| **Total points possible** | **= 600** |

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:

1. Your student portal will be populated with the lecture slides for each upcoming chapter. If you wish, you can print the lecture slides of the chapter.
2. You will have in-class practice worksheets to see how the instructor performs the calculations and chemical formulas. Retain those worksheets for future information and knowledge.
3. Student Support Services (SSS) will have tutors available for this course free of cost. Contact SSS for any tuition needs.
4. tutor.com provides 5 hours of free tutoring online for each UA Rich Mountain student per semester. Johnson Learning Commons has contract with this online site where personal tutors are available 24/7. Create an account and get help personally from home or anywhere if internet access is available. Follow the link to log in www.tutor.com/uarichmountain

Attendance Policy: Absence in this course most often results into failing grades unless covered by immediate action and make-up work. Absence is strictly prohibited unless any unavoidable circumstances. If notified of the absence, the instructor can send you the work and you can catch up with completed work. It is your full responsibility to complete the missed work and cover the missed chapter.

Assignment Due Dates: Students are expected to submit the assignments and other works on or before the assigned due dates. You will be penalized for the late works depending on the number of days and full point and importance of the works assigned.

Make-up Work Policy**:** Make up work should be competed promptly after the absence. A maximum of one week will be the guideline. Make-up exams are given only in instances of the most unavoidable, serious circumstances. Prior notice of absence from an exam is required. Upon return after an absence the student is expected to be prepared for the days' class activities.

Cell Phone Policy**:** Do not use the cellphone unless allowed by the instructor.

Extra Credit Opportunity: Optimum student involvement in the course as well as course-related activities is highly recommended and rewarded with extra credit. The value of extra credit points varies with the nature of the activity and the application of that activity in the real life as well as relation of the activity with the course. Points that can be received are unlimited. Simple idea is: the more you are involved in real-life science experiences, the more you understand and enjoy it, and you get good grades!!! Some examples of activities (but not limited to) that earn extra credit points include:

a) Complete and submit the Parallel Exercises A and B at the end of each chapter.

b) Being an active member of the Science Club coordinated by the instructor
c) Organize activities within the Science Club or participate actively in the activities organized by the Club
d) Taking leadership in group study sessions and manage study sessions with peers
e) Organize or be involved in science and technology awareness activities and helping society to improve utilizing science knowledge
f) Actively participating in science-related meetings and conferences on/off campus
g) Any other science related activities and duties beyond the demand of the course deemed worthy of extra credit by the instructor

**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.

**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.* **under review*

| Credit Hour Requirement Calculator | | | | |
|---|---|---|---|---|
| | | | | |
| **Course Information** | | | | |
| Department, Course Number | PHSC 1003(Lecture) and PHSC1001L(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 |