PSC 114
PHYSICAL SCIENCE
Spring 2020

Class Time and Location: MTWRF 1:34 - 2:24; MHS Room 312
Instructor: Mr. Rodney Rowland
Office Location: MHS Room 312
Office Hours: MTWRF 8:50 – 9:44
Contact Information: 479-394-1144; rodney.rowland@menaschools.org

Prerequisite: A 19 on the reading section of the ACT

Resources:

Textbook: Physical Science, Tenth Edition by Bill W Tillery: McGraw Hill, 2014 ISBN 978-0-07-351389-8.
Laboratory Manual: Physical Science Lab Manual (Revised 2017), Gaumani Gyanwali, UA Rich Mountain

Required Materials:

1. Lab Safety Goggles **2.** Calculator capable of roots and exponents **3.** 2 and ½ inch binder divided into three sections

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: The purpose of the Associates of Arts Program is to provide the student with the knowledge and critical thinking skills that will enable them to analyze problems, arrive at intelligent conclusions, and make reasoned choices in his or her professional and personal life.

- Students will demonstrate an understanding of one-step mathematical calculations and applications.
- Students will demonstrate an understanding of physical and chemical principles.
- Students will apply technological and research skills to identify, locate, and process information.

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 PSC 114, the student should be able to do the following:

1. Recognize the influence of physical science on their daily lives.

2. Explain the philosophy of science: scientific conclusions are based on experimental evidence.
3. Perform a scientific experiment and draw proper conclusions from it.
4. 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.
5. Develop problem solving skills for simple mathematical calculations of practical application.

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

Tentative Schedule for Lecture: Physical Science PSC114

Week	Topics/Activities by Book Chapter	Date/Day
1	Discuss syllabus; Survey, Measurement	
2	Measurement; Force and Motion; Quiz 1	
3	Force and Motion	
4	**Test 1**; Work and Energy	
5	Work and Energy	
6	Work and Energy; Quiz 2; Heat and Temperature	
7	Heat and Temperature	
8	Heat and Temperature; **Test 2**	
9	Wave Motion/Sound	
10	Wave Motion/Sound; Quiz 3	
11	Electricity/Magnetism	
12	Electricity/Magnetism; **Test 3**	
13	Atomic Structure	
14	Atomic Structure; Quiz 4	
15	Periodic Table	
16	Periodic Table**;** Chemical Reactions	
17	Chemical Reactions; **Test 4**	

Tentative Schedule for Lab:

Week	Experiments	Page/Miscellaneous info

1	Syllabus/Safety	Sign the safety agreement
2	1. Measurement	5
3	None	
4	2. Back and Forth Motion	19
5	None	
6	3. Specific Heat of Metals	43
7	None	
8	4. Heating and Cooling Rates	55
9	5. Sound Intensity and Speed	
10	None	
11	6. Caloric Values of Food	77
12	None	
13	7. Composition of a Metal Oxide	101
14	None	
15	8. Types of Chemical Reactions	111
16	None	
17	9. Chemical Reactions and Percentage Yield	123

Course Conduct: The class will be taught using a combination of lecture using *Powerpoint* presentation, solving in-class questions, demonstrations, group interaction and discussions, and performing laboratory experiments. Students are strongly encouraged to discuss concepts and examples when opportunities are given during instructor presentations.

Solving problems forming a study group are not only allowed but encouraged and students are expected to actively take part in discussion. You may seek assistance from Student Support Services (SSS) or Learning Enrichment Advising Center (LEAC) to check the concepts in homework assignments, quizzes, and exam reviews but it is not the responsibility of SSS or LEAC to teach the entire lesson to complete your homework, neither can you directly ask for the answer. You cannot pass the course without completing the given homework. 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 course-related work, 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 quizzes/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 dedicated to this course. This includes the time spent in class. Please see credit hour calculator attached to end of syllabus.

Course Requirements / Evaluation (Grading):

Grades will be evaluated from the following categories:
Quizzes: 15%
Tests: 35%
Problem Sets: 25%
Lab Assignments: 25%

The average score from each category will be multiplied by the weight (above) and then added to the totals from the other categories to compute the course average. This will be

done each quarter as outlined in the MHS handbook. The semester score will be an average of each quarter.

90-100	**A**
80- 89	**B**
70- 79	**C**
60- 69	**D**
0- 59	**F**

Class Procedures/Student Requirements:

On-Campus Resources: UA Rich Mountain offers students assistance with quality tutors available in the Student Support Services and Learning Enrichment and Advising Center in the Johnson Learning Commons.

Attendance Policy: Regular attendance and punctuality are expected. It is the responsibility of the student to initiate arrangements for all missed activities. If an absence is a planned absence the student is expected to make arrangements for making up work prior to the absence. More than three absences will be considered excessive and, along with work not made up, may adversely affect the grade for the course. Under no circumstances will the student receive credit for the course if more than a fourth of the classes are missed (13 classes). In case of extended illness, or other circumstances, the student must contact the instructor if a WP is desired. If the instructor is not notified a failing grade will be assigned for the course. Laboratory work is scheduled for a specific time and day. However, if it can be done safely (guidelines provided in class), students may do the missed laboratory works at another time if course schedule conflicts dictate. Each student is expected to participate in the required laboratory time in order to receive credit for the laboratory activity. There will be no designation of excused or unexcused absences in the lab. If a student is not in lab they will be counted as absent no matter what the reason may be. Also, if the student is present in lab but fails to submit the lab report, it is counted as absent and no point will be awarded for that lab.

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 late work, depending on the number of days the assignment is late. Lab reports will be due three class days after the completion of the lab.

Make-up Work Policy**:** Make up work should be completed promptly after an absence in accordance to the MHS handbook. Exams may be made up the next day that the student is in class only. Lab work that needs to be made up will require time outside of class and it is the responsibility of the student to arrange said time.

Cell Phone Policy**:** Students will follow the policy as outlined in the MHS handbook concerning cell phones.

Academic Dishonesty: It is expected that each student shall do his/her own work on class works, quizzes, exams, and lab reports. Cheating, copying others answers, writing others 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 President 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: University of Arkansas Rich Mountain exists to provide all residents of the Ouachita Mountain Region with exemplary educational and enrichment opportunities to improve the quality of life and standard of living.

Credit Hour Requirement Calculator				
Course Information				
Department, Course Number	PSC 114			
Course Title	Physical Science			
Credit Hours	4			
Mode of Delivery	Traditional			
Weeks in Part of Term	17			
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/Lab			71	71
	Pages Asg'd	**Hours/Week**	**Hours/Term**	
Syllabus Items				
Reading	280			28
Assignment		2		34
Researching Lab questions		2		34
Reviewing for exams			10	10
				0
				0
				0
				0
				0
Total Hours				177
Required Hours				150
Difference				Ok + 27