

FAYETTEVILLE STATE UNIVERSITY
College of Arts and Sciences
Department of Natural Sciences

SYLLABUS

I. LOCATOR INFORMATION:

Semester: Spring		Year: 05
Course Number	Name	Credit Hours
NSCI 110	Comprehensive Physical Science	4

Instructor: Shubo Han, Ph. D

Office Location:LS 326

Office Telephone:672-1303

Office Hours: MWF2:00 - 4:00 pm, T 11:00 am - 1:00 pm
Available at other times by appointment

Departmental Office Location: LS 130

Departmental Office Telephone: 672-1691

II. COURSE DESCRIPTION:

NSCI 110 (Comprehensive Physical Science) will explore the principle concepts of the physical sciences which include physics and chemistry. When taken in sequence with NSCI 120 (Modern Biology) the student will receive a comprehensive view of the major science disciplines. This course will consist of lecture, demonstration, discussion, and laboratory sessions. Every opportunity will be provided for the student to make observations, develop problem-solving skills, and use inductive and deductive reasoning. The overall objective for this course is to assist the student in becoming knowledgeable of the viewpoint of science, its study and limitations, and the application of the "scientific method."

III. TEXTBOOK:

Tillery, Bill W. PHYSICAL SCIENCE, 5th ed. Boston, MA: WCB McGraw-Hill, 2002.

IV. SPECIFIC COURSE OBJECTIVES AND COMPETENCIES:

In view of the scope and sequence of this course, the following objectives have been identified. (Numbers in parentheses identify competencies established by the State Department of Public Instruction for Middle Grades Education majors.)

Students shall:

- A. Understand the relationships between matter, energy, and motion.
 1. List the International System units of measure for length, mass, volume, time, and force; and apply the basic metric system prefixes to these measurements.
 2. Define mechanics, vector and scalar quantities, speed, velocity, acceleration, work, potential

energy, kinetic energy, power, and momentum; and calculate any of these when given sufficient data.

3. State Newton's three laws of motion and use each to analyze the implications for objects at rest or in motion. (Physics 31)
4. Discuss the differences between nuclear fusion and nuclear fission reactions, and characterize each as to changes in mass, atomic structure, and radiation. (Physics 29)
5. List and describe the properties of waves and waveforms and compare and contrast electromagnetic radiation with sound. (Physics 33)
6. Explain and interpret heat, temperature, specific heat, heat capacity, entropy, plasma, latent heat of fusion, latent heat of vaporization, and the laws of thermodynamics. (Physics 29)
7. Differentiate between conductors and insulators, super conductor and semiconductor, AC and DC current, series and parallel circuits, a motor and a generator, and other technological devices. (Physics 30, 32, 34)

B. Understand the macro- and microscopic composition of matter.

1. Describe the general structure of an atom and distinguish between the electromagnetic, gravitational, and nuclear forces that bind the atom together. (Chemistry 13, 14)
2. Identify the relationships between atomic structure, atomic mass, atomic number, periodic ordering, and chemical bonding. (Chemistry 15)
3. Define compounds, mixtures, molecules, ions, solutions, colloids, and exothermic/ endothermic reactions, activation energy, equilibrium, and electrochemistry. (Chemistry 17, 18)
4. Define organic chemistry and relate its nomenclature and structure to the various classes of organic compounds such as aliphatic, aromatic, and the major biochemical compounds.
5. Utilize chemical symbols to construct, balance, and read chemical equations.

V. EVALUATION CRITERIA:

The progress of each student will be evaluated by means of FIVE one-hour exams to be given during the semester, reports related to the laboratory exercises to be performed, and a comprehensive final examination. The lowest exam may be dropped at the discretion of the instructor.

A. Grade Distribution:

Final grades will be determined by weighting the averages and scores from the above-mentioned evaluative activities.

Hour Exams & Quizzes	50%
Laboratory Exercises	25%
Final Examination	25%

B. Grading Scale:

The final letter grade assigned to the student will be based upon the following numerical equivalencies as stated in the University Catalog.

A =	93	-	100
B =	83	-	92
C =	73	-	82
D =	64	-	72
F =	Below		64

VI. COURSE OUTLINE WITH ASSIGNMENT SCHEDULE:

Lectures and laboratory exercises will be undertaken in accordance with the following assignment schedule. The laboratory work may take the form of discussions, demonstrations, paperwork exercises,

further excursions into the depths of the principles of theory with explanations by the instructor, as well as hands-on investigations involving the submission of a lab report by the student. It is also assumed that in addition to the topics listed below, the student is assigned both the textual material as well as the exercise problems at the end of the chapters. Listed below is the tentative lab and examination schedule that may change due to constraints imposed by equipment and space limitations.

WEEK	CHAPTER	ASSIGNMENT
Classes Start Jan 6 th	1	Metric System; units, linear graphs, slopes, nature of science, ratios, density. LAB #1 - Significant figures, graphing, slopes
Jan 10 th	2	Motion, velocity, acceleration, free fall. LAB #2 - Measurements, Conversions and Density
Jan 17 th MLK Holiday	3	Newton's laws of motion, forces, momentum, and circular motion. LAB #3 - Simple pendulum
Jan 24 th	4	Work, energy, potential energy, and kinetic energy. LAB #4 – Work and Power
Jan 31 st	5	Molecular theory, temperature and heat, and thermodynamics. LAB #5 – Specific heat of metals
Feb 7 th	6	Wave motion and sound, properties of waves. LAB #6 – Speed of sound in air
Feb 14 th	7	Electricity LAB # 7 – Ohms's Law
Feb 21 st	8	Light, reflection, refraction, diffraction, and interference. LAB #8 – The inverse square law of light
Feb 28 th thru Mar 5 th		Spring Break
Mar 7 th	9	Atomic structure, periodic table, and elements. LAB #9 – Periodic properties of elements
Mar 14 th	10	Matter classification, elements, compounds, and mixtures. LAB #10 – Identification of substances based on physical/chemical properties
Mar 21 st	11	Compounds and chemical change, ionic and covalent bonds, chemical formulas, equations and balancing. LAB #11 – Chemical reactions
Mar 28 th	12	Chemical formulas and chemical equations and balancing. LAB #12 – Chemical reactions (continued)
April 4 th	13	Water and solutions, pH, acids, bases, and salts. Lab # 13 – Properties of acids and bases
April 11 th	14	Organic chemistry, hydrocarbons, and derivatives. LAB #14 – Models of simple hydrocarbons.
April 18 th	15	Nuclear reactions, radioactivity, and nuclear energy. Lab #15 – Calculations of half life
April 25 th		Last Day of Classes
April 28 th	Final Exam	Thursday, 6:00 – 8:00 pm

VII. COURSE REQUIREMENTS:

Students are required to:

1. Attend all lecture and laboratory sessions, except in cases of illness and other unforeseen emergencies. It is the student's responsibility to contact the instructor about the steps that must be taken for making up any and all missed work. It is recommended that contact with the instructor take place within twenty-four (24) hours of having missed class. The University policy concerning absences from class will be strictly enforced. The instructor will request administrative withdrawal for students who either incur TWO CONSECUTIVE ABSENCES, or whose absences exceed 10% of the total contact hours the course meets during the semester. For this course, that would amount to approximately seven (7) total hours of unexcused absences after which the instructor will also submit an administrative withdrawal for the student. See the university catalog for the details.
2. Be punctual. Attendance will be taken promptly at the beginning of each session. Any student coming in after the roll has been called will have been marked absent. It is the student's responsibility to see that all tardies have been duly noted. Students will also be charged with a tardy for departure from the class before the specified end of class. The accumulation of three (3) tardies will result in the student being charged with one (1) absence.
3. Participate actively in classroom discussions and activities. Two key ingredients of every student's learning are sharing opinions and experiences with others, and interacting with others in the teaching-learning situation.
4. Read over and take notes on the indicated chapters BEFORE they are presented in class. This activity mentally prepares one for the learning experience. It also is important because it raises questions that one needs to have answered in order to fully understand concepts presented.
5. Take notes in class. Recopy these notes at the first opportunity after class and certainly the same day as the class in which the notes were taken. Reconcile any discrepancies in the notes taken in class as well as with notes taken in initial reading. Add explanations or drawings or other examples for clarity.
6. Study about two hours for each hour of lecture. This is an absolute minimum for maximum success in a class.
7. Avail themselves of all pertinent audiovisual and computer-assisted instructional materials.
8. Take examinations ON THE SCHEDULED DATES. No make-up examinations will undertake. An automatic grade of ZERO is recorded for any exam missed for any reason.
9. Be in compliance with the university policy on drugs which prohibits the possession or use of alcoholic beverages or illegal drugs on any part of the campus.
10. SEE THE INSTRUCTOR IMMEDIATELY WHEN SPECIFIC DIFFICULTIES ARE ENCOUNTERED.

IX. TEACHING STRATEGIES:

The primary teaching strategy for this course will take the form of lectures and demonstrations of the specific processes and effects related to the topics of interest. Particular sections of the course will be taught in accordance to the instructional styles of the individual faculty member.

BIBLIOGRAPHY

The textbook will be considered the primary resource in this class. However, textbooks often do not contain enough information or information in the manner that will be most advantageous for student learning. In light of these shortcomings, it is recommended that each student perform additional reading on each topic covered in class. This may be accomplished by seeking other physical science texts in the library or the instructor's office.