

SCI 210A

INTEGRATED SCIENCE I

3 cr. (2-2)

COURSE DESCRIPTION:

Integrated Science is a lecture-laboratory course designed to provide a wide-ranging background in the life and physical sciences. The primary focus will be on providing the pre-service teacher with the information needed to meet the new science education standards based on content and inquiry methods. Future K-8 teachers will acquire knowledge that can be directly applied to lessons they will teach in the classroom, as well as enhancing their own personal scientific literacy. Science 210A will concentrate on the physical sciences.

PREREQUISITES: None**COURSE OBJECTIVES:**

1. To organize and discuss the fundamental concepts and principles in the physical and life sciences.
2. To define and articulate the critical interrelationships between the sciences.
3. To discriminate between accepted scientific reasoning methods and pseudo-science.
4. To demonstrate the skills of scientific inquiry and become experienced in the use of technology to gather, evaluate, and interpret data.
5. To demonstrate a working knowledge of the scientific method in the context of common, real-life experiences.
6. To participate collaboratively with other students in conducting scientific investigations, and to effectively communicate the resulting conclusions.

COURSE OUTLINE: (Tentative)

- I. NATURE OF SCIENCE
 - A. Measurement Systems
 - B. Density Ratio
 1. Fish density
 - C. Scientific Methods
 1. Evolution, plate tectonics
 - D. Pseudoscience
- II. MOTION
 - A. Measuring Motion
 1. Speed, velocity, acceleration
 - a. speed of light
 - b. wind speeds
 - c. biological growth rates
 - B. Forces

- 1. Net force
 - C. Falling Objects
 - 1. Free fall
 - D. Projectiles
 - E. Newton's Laws of Motion
 - 1. Weight and mass
 - 2. Swimming scallops
 - F. Universal Gravitation
 - 1. Zero g
- III. ENERGY
- A. Work
 - B. Power
 - C. Potential Energy
 - 1. Chemical energy
 - D. Kinetic Energy
 - E. Energy Flow
 - 1. Photosynthesis and burning
 - F. Conservation of Energy
 - G. Energy for Life
 - 1. Fossil fuels
 - 2. Solar energy
- IV. HEAT AND TEMPERATURE
- A. Molecules in Motion
 - 1. Phases of matter
 - B. Temperature
 - 1. Temperature scales
 - a. human thermometers
 - b. goosebumps
 - C. Definition of Heat
 - 1. Measurement of heat
 - 2. Energy of food
 - D. Specific Heat
 - E. Heat Flow
 - 1. Convection in atmosphere
 - a. local and global wind patterns
 - b. climate belts
- V. WAVES AND SOUND
- A. Vibrations and Types of Waves
 - 1. Waves in air
 - 2. Seismic waves and earth's interior
 - a. tsunamis: seismic sea waves

- B. The Human Ear
 - 1. Animal limits on hearing
 - C. Sound Waves
 - 1. How animals make sound
 - D. Interference
 - 2. Standing waves
 - E. Doppler Effect
- VI. ELECTRICITY
- A. Electric Charge
 - 1. Measuring electric forces
 - 2. Lightning discharges
 - B. Electric Current
 - 1. Hydrogen and fuel cells
 - C. Magnetism
 - 1. Magnetic fields
 - a. earth's magnetism
 - b. biomagnetism
 - c. lemon battery and galvanometer
- VII. PROPERTIES OF LIGHT
- A. Electromagnetic Waves
 - 1. Sunlight
 - a. earth's seasons
 - b. ozone and UV light
 - B. Transparent and Opaque Materials
 - 1. Global warming
 - 2. Eclipses
 - C. Reflection and Reflection
 - D. Seeing Light: The Eye
 - 1. Frequency range of animals
 - 2. Microscopes
 - E. Color
 - 1. Mixing colored light
 - 2. Color in nature
- VIII. THE UNIVERSE AND THE SOLAR SYSTEM
- A. The Night Sky
 - 1. Animal migrations and navigation
 - B. The Life of Stars
 - 1. Sun
 - 2. Black holes
 - C. Galaxies
 - 1. Extraterrestrials
 - 2. Biological conditions for life

IX. THE SOLAR SYSTEM

A. Origin of Solar System

1. Inner planets
 - a. Earth
 - i. seasons and climate belts
 - ii. life, iron, and the modern atmosphere
 - b. Earth's moon
2. Outer planets
3. Comets
4. Asteroids
5. Meteorites
 - a. carbonaceous – amino acids
 - b. Fossils from Mars?
6. Recent planetary exploration
 - a. Cassini, Mars rovers

B. Astrology: Pseudoscience

X. THE SOLID EARTH

A. Minerals

1. Health risk of asbestos

B. Rocks and the Rock Cycle

C. Earth's Interior

1. Crust, mantle, core
2. Physical layering

D. Plate Tectonics

1. Scientific methods
 - a. early evidence and hypotheses
 - b. testing the model
2. Plate margins

XI. EARTH SYSTEMS

A. Internal Geologic Processes

1. Earthquakes and seismic waves
2. Volcanism
 - a. changes to atmosphere and climate
3. Origin of mountains

B. External Geologic Process

1. Weathering
 - a. chemistry of weathering
 - b. soil types and analysis
 - c. acid rain, acid mine runoff
2. Agents of erosion

C. The Ocean Floor

1. Major features
 - a. deep sea sediments
2. Life in the sea
 - a. deep sea organisms at hydrothermal vents

COURSE REQUIREMENTS:

Classroom Policy. Attendance is mandatory for lecture and laboratory. You will start the semester with 25 attendance points. After two (2) absences you will lose five (5) points for every day you are not counted as present.

Quizzes. Every two weeks there will be a 25-point quiz at the beginning of the lecture. Material for each quiz will come from lecture notes, reading assignments, and video programs. The two lowest quiz scores will be dropped. There will be no makeup quizzes, if you miss a quiz for any reason it will be counted as a drop.

Final Exam. A comprehensive final exam will be worth 100 points.

Laboratory. This is a laboratory science course, so there is a 100 minute lab session scheduled for each week. You should read the appropriate sections in the lab manual **before** coming to lab. Most of the labs will be graded and are worth 10 points each. The lowest lab score will be dropped.

Student Success Center. Tutors may be obtained through the Student Success Center. Contact the staff in C219 if this service is desired. John A. Logan College will make reasonable accommodations for students with documented disabilities under Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Any student with a disability that may have some impact on work in this class, who feels she/he needs an accommodation, should make an appointment with the Coordinator of Services for Students with Disabilities on campus, Jennifer Frost, Room C219B, Ext. 8516. Before services can be provided, this advisor must determine eligibility and arrange appropriate academic adjustments. ***It is the student's responsibility to register in advance of a school term with this office and to turn in a schedule each term to ensure that there is every opportunity for success in this class.***

English Writing Center/Tutoring. For assistance with writing assignments in any college course, students are encouraged to visit "The Write Place" in Room E109. English instructors are available for one-on-one tutoring each semester during hours posted at the center.

Financial Aid. Students who receive financial assistance and completely withdraw from classes prior to 60% of the semester being completed (approximately 2-3 weeks after midterm) could be responsible to return a portion of their Federal Pell Grant award. Prior to withdrawing from courses, students should contact the Financial Aid Office.

Course Withdrawal Information. It is expected that you will attend this class regularly. If you stop attending for any reason, you should contact your advisor and withdraw officially to avoid the posting of a failing grade (an E) to your transcript. It is also advisable to discuss the situation with your instructor before dropping.

METHOD OF EVALUATION:

Quizzes	125 points	A	100-88%
Laboratory	110 points	B	87-75%
Final Exam	100 points	C	74-61%
Attendance	<u>25 points</u>	D	60-50%
Total	360 points	E	<50%

METHOD OF PRESENTATION:

Lecture, discussion, lab assignments, demonstrations, and audio-visual media

TEXT:

Lecture: Conceptual Integrated Science, Hewitt P., Lyons S., Suchocki J., and Yeh J., 1st ed., 2007. ISBN: 0-8053-9038-3

Laboratory: Laboratory Manual for Conceptual Integrated Science, Hewitt, et al, 1st ed., 2007. ISBN: 0-8053-9073-1

INSTRUCTOR: Robert McKenzie
Office: G218
Office Hours: TBA and posted
Ext.: 8752
E-mail: robertmckenzie@jalc.edu

DATE: Fall, 2009

John A. Logan College Telephone Numbers

Cartersville and Williamson County	985-3741 (operator)
	985-2828 (direct extension access)
Carbondale and Jackson County	549-7335 (operator)
	457-7676 (direct extension access)
Du Quoin	542-8612
West Frankfort.....	937-3438
Crab Orchard, Gorham, & Trico areas	1-800-851-4720
TTY (hearing-impaired access)	985-2752

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