SCIE 4101-001: SPECIAL TOPICS IN COMPOSITE SCIENCE
Fall 2016 – August 29 to October 17

Instructor(s): Dr. Greg Hale and Ms. Sandra Miller

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Faculty Profile: https://www.uta.edu/profiles/gregory-hale

Office Hours: Dr. Hale and Ms. Miller: by appointment

Time and Place of Class Meetings: 5:30 to 7:20**,** Mondays/Tuesdays, Life Science 138

Description of Course Content: This course is an overview of math, chemistry, and physics topics covered by the Texas Examination of Educator Standards.

Course Schedule

8/29	Intro, Project Description, Forces and Motion
8/30	Electricity and Magnetism
9/5	labor Day – No Class
9/6	Waves
9/12	Number Concepts and Properties of Real Numbers
9/13	Patterns and Algebra 1 Topics
9/19	Measurement and Geometry Topics
9/20	Geometry Topics
9/26	Algebra 2 Topics
9/27	Trigonometry and Precalculus Topics
10/3	Probability and Statistics Topics
10/4	Metric System, Sig Figs, Atomic Structure
10/10	Formulas, Balancing Equations
10/11	Bonding, Chemical Change, Gases
10/17	Reactions, Acids & Bases
10/18	Student Projects

Required Textbooks and Other Course Materials: Necessary materials will be provided in handout form and/or on the course Blackboard site.

Grading Policy and major assignments and examinations:

Review Topic Packet	30% (topics will be assigned)
Quizzes	70% (There will be a quiz most classes. No make-ups allowed.)

A	≥90.0%	B	≥80.0%	C	≥70.0%	D	≥60.0%

Student Learning Outcomes: Apply concepts to solve problems in the following areas:

- Atomic structure
- Chemical formulas and naming
- Chemical equations
- Chemical reactions
- Number concepts
- Number patterns
- Geometry
- Algebra
- Trigonometry
- Probability and Statistics
- Forces and motion
- Electricity and magnetism
- Harmonic motion, waves, sound, and light

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. The instructors of this section will not take attendance, however students must be in attendance to complete the quizzes.

Make-up Exams/Assignments: No make-up quizzes will be offered.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at

www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit* www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.
I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located to the right as you exit room 101 Life Science.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/universitycollege/resources/index.php

The IDEAS Center: (2nd Floor of Central Library) offers free tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381

As the instructors for this course, we reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –Gregory R. Hale; Sandra Miller

Review Topic Packet Assignment

Directions for completing Domain IX - Life Science Questions

1. Do not put your name on the document. I will know who did the work based on the domain number.

2. Write the competency and wording for competency at the top of the page: Example:
Competency 030 - The teacher understands the structure and function of living things.

3. Write the topic for the questions: Example

Describe characteristics of organisms from the major taxonomic groups.

4. Put your questions under the topic. They should be multiple choice and look like the sample questions in the official preparation manuals. At the end of each set of questions, insert a page break and place the answers on the next page.

Write a total of 20 questions spread as evenly as possible over the subtopics.

5. Email to greg@hale.uta.edu.

DOMAIN IX—LIFE SCIENCE

Competency 030: The teacher understands the structure and function of living things.

The beginning teacher:

1. Describes characteristics of organisms from the major taxonomic groups, including domains and kingdoms and uses these characteristics to construct a dichotomous key.
2. Analyzes how structure complements function in cells.
3. Analyzes how structure complements function in tissues, organs, organ systems and organisms including both plants and animals.
4. Identifies human body systems and describes their functions (e.g., digestive, circulatory).
5. Describes how organisms, including producers, consumers and decomposers obtain and use energy and matter.
6. Applies chemical principles to describe the structure and function of the basic chemical components (e.g., proteins, carbohydrates, lipids, nucleic acids) of living things and distinguishes between organic and inorganic compounds.

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DOMAIN IX—LIFE SCIENCE

Competency 031: The teacher understands reproduction and the mechanisms of heredity.

The beginning teacher:

1. Compares and contrasts sexual and asexual reproduction.
2. Understands the organization of hereditary material (e.g., DNA, genes, chromosomes).
3. Describes how an inherited trait can be determined by one or many genes and how more than one trait can be influenced by a single gene.
4. Distinguishes between dominant and recessive traits and predicts the probable outcomes of genetic combinations.
5. Evaluates the influence of environmental and genetic factors on the traits of an organism.
6. Describes current applications of genetic research (e.g., related to cloning, reproduction, health, industry, agriculture).

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DOMAIN IX—LIFE SCIENCE

Competency 032: The teacher understands adaptations of organisms and the theory of evolution.

The beginning teacher:

1. Describes similarities and differences among various types of organisms and methods of classifying organisms (e.g., presence of a nucleus determines if a cell is prokaryotic and eukaryotic).
2. Describes traits in a population or species that enhance its survival and reproductive success.
3. Describes how populations and species change through time.
4. Applies knowledge of the mechanisms and processes of biological evolution (e.g., variation, mutation, environmental factors, natural selection).
5. Describes evidence that supports the theory of evolution of life on Earth.

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DOMAIN IX—LIFE SCIENCE

Competency 033: The teacher understands regulatory mechanisms and behavior.

The beginning teacher:

1. Describes how organisms respond to internal and external stimuli.
2. Applies knowledge of structures and physiological processes that maintain stable internal conditions.
3. Demonstrates an understanding of feedback mechanisms that allow organisms to maintain stable internal conditions.
4. Understands how evolutionary history affects behavior.

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DOMAIN IX—LIFE SCIENCE

Competency 034: The teacher understands the relationships between organisms and the environment.

The beginning teacher:

1. Understands the levels of organization within an ecosystem (organism, population, community) and identifies the abiotic and biotic components of an ecosystem.
2. Analyzes the interrelationships (food chains, food webs) among producers, consumers and decomposers in an ecosystem.
3. Identifies factors that influence the size and growth of populations in an ecosystem.
4. Analyzes adaptive characteristics that result in a population's or species' unique niche in an ecosystem.
5. Describes and analyzes energy flow through various types of ecosystems.
6. Knows how populations and species modify and affect ecosystems (e.g., succession), and how biodiversity affects the sustainability of ecosystems.

Directions for completing Domain X – Earth & Space Science Questions

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DOMAIN X—EARTH & SPACE SCIENCE

Competency 035: The teacher understands the structure and function of earth systems.

The beginning teacher:

1. Understands the layers and surface features (landforms) of Earth and uses topographic maps and satellite imaging to analyze constructive and destructive processes that produce geologic change.
2. Understands the form and function of surface and subsurface water (e.g., watershed, aquifer).
3. Applies knowledge of the composition and structure of the atmosphere and its properties, including characteristics that allow life to exist.
4. Demonstrates an understanding of the interactions that occur among the biosphere, geosphere, hydrosphere and atmosphere.
5. Applies knowledge of how human activity and natural processes, both gradual and catastrophic, can alter earth and ocean systems.
6. Identifies the sources of energy (e.g., solar, geothermal, wind, hydroelectric, biofuels) in earth systems and describes mechanisms of energy transfer (e.g., conduction, convection, radiation).

Directions for completing Domain X – Earth & Space Science Questions

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DOMAIN X—EARTH & SPACE SCIENCE

Competency 036: The teacher understands cycles in earth systems. The beginning teacher:

1. Understands the rock cycle and how rocks, minerals, fossil fuels and soils are formed.
2. Understands the water cycle and its relationship to weather processes; how the sun and the ocean interact in the water cycle.
3. Understands the nutrient (e.g., carbon, nitrogen) cycle and its relationship to earth systems.
4. Applies knowledge of how human and natural processes affect Earth systems.
5. Understands the dynamic interactions that occur among the various cycles in the biosphere, geosphere, hydrosphere and atmosphere.

Directions for completing Domain X – Earth & Space Science Questions

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3. Write the topic for the questions: Example

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DOMAIN X—EARTH & SPACE SCIENCE

Competency 037: The teacher understands the role of energy in weather and climate.

The beginning teacher:

1. Understands the elements of weather (e.g., humidity, wind speed, pressure, temperature) and how they are measured.
2. Compares and contrasts weather and climate.
3. Analyzes weather charts and data to make weather predictions based on local and global patterns.
4. Applies knowledge of how transfers of energy among earth systems affect weather and climate.
5. Analyzes how Earth's position, orientation and surface features affect weather and climate.

Directions for completing Domain X – Earth & Space Science Questions

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DOMAIN X—EARTH & SPACE SCIENCE

Competency 038: The teacher understands the characteristics of the solar system and the universe.

The beginning teacher:

1. Understands the properties and characteristics of celestial objects.
2. Applies knowledge of the Earth-moon-sun system and the interactions among them (e.g., seasons, lunar phases, eclipses).
3. Identifies properties of the components of the solar system, including systems that allow life to exist.
4. Recognizes characteristics of stars, nebulae and galaxies and their distribution in the universe.
5. Demonstrates an understanding of scientific theories of the origin of the universe.

Directions for completing Domain X – Earth & Space Science Questions

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DOMAIN X—EARTH & SPACE SCIENCE

Competency 039: The teacher understands the history of the Earth system. The beginning teacher:

1. Understands the scope of the geologic time scale and its relationship to geologic processes.
2. Demonstrates an understanding of theories about the earth's origin and geologic history.
3. Demonstrates an understanding of how tectonic forces have shaped landforms over time.
4. Understands the formation of fossils and the importance of the fossil record in explaining the Earth's history.