SMTE 4217: Secondary Approaches to the Life Sciences

SCIENCE, MATHEMATICS, AND TECHNOLOGY EDUCATION 4217.001
MWF 12:00-12:50
Classroom: Science and Technology (ST) 201

INSTRUCTOR:
Cherie A. McCollough, Ph.D.
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Office Hours: MW 2-4
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Students are welcome to make appointments to see me at times other than those listed above. If I am unavailable or need to relocate during office hours, I will post a note on my office door. You are welcome to come by my office at other times and if I am not busy, I would be happy to help you. A phone call is usually the best way to coordinate seeing me outside of office hours.

COURSE DESCRIPTION: Study of secondary science teaching and learning from the standpoints of theory and practice, curriculum objectives, materials and evaluation. The course will emphasize contemporary issues in biology ranging across the subdisciplines of molecular biology, physiology, evolution and environmental science. Examples of issues used to teach biological concepts are used including the Human Genome Project, DNA Fingerprinting, Cloning, Drug Addiction, Antibiotic Resistance, AIDS, Human Evolution, Acid Rain, Global Warming and other contemporary concepts relevant for middle and high school science classrooms and associated with the Texas Essential Knowledge and Skills (TEKS). Science content will be presented in contexts found in underlying issues presented in readings from current publications such as Time magazine, U.S. News & World Report and Newsweek as well as more traditional formats. Instruction regarding pedagogical foundations are those that are contained in the National Science Content Standards and Science Teaching Standards as prescribed by the National Science Education Standards, the National Science Teachers Association and the Texas Education Agency. Laboratory activities are either conducted in a computer laboratory and consist of topics examined by introductory videos and web searches or are more traditional “web laboratory” activities as are required by the state of Texas science teaching standards.

REQUIRED READINGS: Because this course is based on contemporary issues in biology, you will be expected to read selected articles from recent journals prior to class. These articles are available in WebCT as will supplemental readings, handouts, and other materials. If you would like to examine a biological concept in more detail after the lecture, a biology textbook such as Campbell and Reece’s Biology is a good resource.
OTHER RESOURCES: The instructor will make additional learning resources (e.g., books, handouts, reserve articles, software, websites) available during the semester. You will be given information about these resources. In addition, invited speakers may address various topics during this class.

STUDENT LEARNING OUTCOMES: This course gives students majoring in biology, chemistry, or physics (Teacher Certification) an opportunity to learn contemporary methods of teaching science content in middle/junior high schools and high schools. Emphasis will be placed on exploring appropriate models which reflect the nature, content and context of science teaching; the characteristics of students; and the nature of the instructional setting. The subject matter of science will serve as the vehicle to illustrate and develop an understanding of instruction.

The major course goal is to provide the pre-service science teacher with appropriate experiences for initial growth as a professional science teacher.

As a result of the course, the student will gain experiences in:
1. designing instruction for teaching the content and processes of science in a way that accounts for the nature of science and the nature of the learner;
2. utilizing specific teaching methods that encourage inquiry, discussion, laboratory activities, and knowledge construction;
3. modifying instruction to meet the varied needs, abilities and interests of student populations;
4. demonstrating an understanding of the interrelationships between science disciplines as well as between science and other academic areas;
5. developing a positive attitude toward science;
6. providing evidence of knowledge of ability to provide instruction relative to science-related societal issues;
7. becoming acquainted with current issues related to science education reform and realizing the inherent personal responsibility of upholding the professionalism required in science teaching.

ATTENDANCE POLICIES: I WILL BE TAKING ATTENDANCE AT EACH CLASS. STUDENTS ARE GIVEN ONE UNEXCUSED ABSENCE PER SEMESTER FOR THIS CLASS. AFTER THAT ABSENCE, THEY WILL RECEIVE A 10% DROP IN THEIR FINAL LETTER GRADE FOR EACH ADDITIONAL UNEXCUSED ABSENCE. LEAVING CLASS EARLY/ARRIVING LATE FOR CLASS WILL COUNT AS ½ ABSENCE.

Family vacations and celebrations of your 21st birthday are worthwhile, but are not classified as excused absences. If you book an airplane flight which conflicts with class, I do NOT consider that to be an excused absence. Routine events should be scheduled to avoid class conflicts. In general, only unavoidable absences are excused (major family illness or accidents, deaths, funerals).

Points missed because of an unexcused absence (including tardiness and leaving early) cannot be recovered. An excused absence allows us to make alternative arrangements.
for completing assignments. The documentation required for an absence to be excused must be…

- from an appropriate source (e.g., doctor, dentist, funeral director) who states the nature of the event that caused (or will cause) your absence.
- in writing, on official stationary, and signed. (I do not return excuses to you.) Telephone calls, FAXes, and e-mails are not acceptable.
- presented prior to the absence for a scheduled event (e.g., university-sponsored activity, recognized religious holiday, military service).
- presented no more than one week after the date of an unexpected absence.

Unacceptable Excuses: Only unavoidable absences are excused (see above), so you should schedule routine personal events (e.g., vacations, wedding, reunions, non-emergency medical or dental visits, parent-teacher conferences, household or auto repairs) to avoid conflicts with your classes. Oversleeping is never an acceptable excuse. Employment conflicts are not acceptable excuses for absences, tardiness, or leaving class early. Texas waves jury duty for students, so jury duty is not an acceptable excuse. If you arrange to take any test at an alternate time and do not show for that appointment, then you forfeit the opportunity to take the test except at its originally scheduled time.

It is the responsibility of the student to obtain any material missed during an absence from his/her classmates. It is always your responsibility to determine what happened in class or laboratory during your absence. If you are absent, you must obtain any handouts or assignments from me in my office on your own time: I rarely bring assignments to class more than once. You must obtain class notes from other students.

Special circumstances may warrant deviating from these guidelines (including administering a “make-up” examination) and will be refereed to the Vice President of Student Affairs. This also applies to any situations for which you cannot provide an acceptable excuse as outlined above.

Scholastic dishonesty will not be tolerated. All students are expected to conform to college level standards of academic integrity and quality of work (this includes spelling and grammar where applicable). Additional general guidelines that may be of interest to the student can be found in the “General Academic Policies and Regulations” section of the 2005 – 2006 TAMUCC undergraduate catalogue as well as the “The Student Code of Conduct”. In cases involving a academic dishonesty as defined by the Student Handbook, proceedings that have been outlined in the Catalog 2005-2006: Texas A&M University – Corpus Christi will be followed. Except in cases were prior arrangements have been made with the instructor for university approved absences, there is no provision for making up late work and/or missed exams and quizzes. Anyone arriving after someone has completed an examination and left the room will not be allowed to take that examination. If you leave an examination room, for any reason, you must hand in your answer sheet and you will not be allowed to resume the examination. In the event of an examination that is missed, regardless of circumstances regarding illness, absenteeism, death in the family, etc., NO make-up examinations will be administered as that grade will be dropped if it is the lowest grade.
***Please turn off all cell phones, beepers, Palm Pilots, etc., before entering the classroom or laboratory, or at least place them on silent mode.

Students with Disabilities: The Students with Disabilities Center is located in the Student Services Center (361.825.5816). If you have special needs, please contact this center. I cannot make modifications without the center’s involvement, even if you show me your IEP. If you have mobility problems, please notify me so that assistance can be given in case of fire drills or emergencies.

Dropping a class
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the academic calendar and/or instructor for the last day to drop a class with an automatic grade of “W” this term.

Grade Appeals
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

Disabilities Accommodations
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.
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If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

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**EVALUATION**

Points will be awarded for the following. Please refer to handouts for rubrics, criteria, and examples of completed assignments and examinations in order to identify expectations for these assignments. **Every student should have a clear idea of expectations prior to completion of the following assignments/test administration.** Any and all questions regarding expectations should be immediately referred to the instructor. Please do not wait until the day before the assignment is due to ask questions!

1. Four examinations @ 200 points each  
   - Total: 800 points
2. Laboratory exercises: 10@ 14 points  
   - 140 points
3. Lecture Quizes (each lecture) 10 points  
   - 200 points
4. Lesson Plans (2 @ 100 points each)  
   - 200 points

**Total: 1340 points**

Scale:

- A – 90% - 100%
- B – 80% - 89%
- C – 70% – 79%
- D – 60% - 69%

Note; the above evaluation schedule is subject to minor changes as we progress through the course. It is the student’s responsibility to check their course grades on WebCT and make sure that accuracy is maintained.
NOTE: Several readings will be updated as semester progresses. Please keep informed of these changes via instructor/fellow classmate.

Section I

Week 1

Aug 30, Lecture - Introduction, Scientific Method and Publication
No Reading

Sept 1, (outside of class assignment) Laboratory 1 - The Web as a Scientific Resource

Week 2

Sept 8, Lecture - Prostate Cancer

Week 3

Sept 13, Lecture - Menopause and Hormone Replacement Therapy

Sept 15, Lecture – Human Sexuality
Reading – Chlamydia. MayoClinic.
http://www.mayoclinic.com/health/chlamydia/DS00173

Week 4

Sept 20, Lecture - Human Development and Stem Cells

Sept 22, Laboratory 2 – DNA and Epigenetics
Reading - Why Genes Aren’t Our Destiny, John Cloud, TIME Jan 18 2010

Week 5

Sept 27, Lab 3 - Individuality and Cloning
Reading – The Perils of Cloning, Alice Park, Time, July 10, 2006 (be sure to read the question, answer part at the end as well)

Section II

Week 6

Oct 4, Lecture – Exam I (both lect. & lab)

Oct 6, Lecture – Alcohol and Human Health

LESSON PLAN I DUE

Week 7

Oct 11, Laboratory 5 - Ulcers and the Scientific Method

Oct 13, Lecture - Heart Disease

Week 8

Oct 18, Lecture - Smoking, Emphysema and Lung Cancer

Oct 20, Laboratory 6 - Heart Attacks

Week 9

Oct 25, Laboratory 7 - DNA Fingerprinting


Oct 27, Laboratory 8 - Weight Control
Nov 1, Exam II (both lect. & lab)

SECTION III

Nov 3, Lecture - Parasites and Disease

Week 11

Nov 8 Lecture: Viruses
Reading – Inside a fight against a flu pandemic. Michael Scherer. Time, Aug 17, 2009

Nov 10: The Immune System, Viruses and Bacteria

Week 12

Nov 15, Lecture - Exotic Species and the Environment

Nov 17, Laboratory 9 – Global Warming
Reading - Polar Ice Caps Are Melting Faster Than Ever... More And More: Land Is Being Devastated By Drought... Rising Waters Are Drowning Low-Lying Communities... By Any Measure, Earth Is At ... The Tipping Point The climate is crashing, and global warming is to blame. Why the crisis hit so soon--and what we can do about it. Jeffrey Kluger. Time, April 3, 2006.

LESSON PLAN II DUE

Week 13

Nov 22, Laboratory 10 - Antibiotic Resistance

Nov 24, Thanksgiving Holiday (according to Dr. Mac)

Week 14

Nov 29, Lecture - Origin and Evolution of Life on Earth
Dec 1, Acid Rain and Ozone Hole
Reading: The Other Climate Threat: Transportation. Schafer, Jacoby, Heywood and Waitz; American Scientist, 2009.

Week 15
Dec 6th Exam III (both lect. & lab)

Final Exam IV (both lect. & lab) Date/Time will be announced.