Division: Teacher Education
Program Area: Science Education
Course #: SCE 5010
Course Title: Biological Sciences for Elementary and Middle School Teachers
Course Credit: Three Semester Hours
Section #: 004
Term/Year: Winter 2013
Course Location: Room 253, College of Education
Days: Thursdays  Time: 9:35 AM – 12:20 PM
Instructor: Dr. David Grueber
Office Address: College of Education, Room 287
Office Phone: 313/577-0928
Email: grueber@wayne.edu Website: http://blackboard.wayne.edu
Office Hours: Wednesdays 3:00 PM - 5:00 PM
Thursdays 2:00 PM - 5:00 PM

Course Description:
This course covers significant biological principles, generalizations, and understandings with relation to their use with children in elementary and middle school. Appropriate learning activities, experiments, field trips, text and reference materials, technological applications, and evaluation are used.

Student Outcomes:
As a result of participating in the activities related to this course, the students should be able to:

1. Know, understand and apply basic concepts and principles related to life science.
2. Related their understanding of life science to current societal issues.

3. Use inquiry to learn about natural phenomena – design and conduct investigations on topics related to life science using appropriate methodology and technology.

4. Apply mathematics in the collection, analysis and interpretation of data.

5. Communicate findings using appropriate technologies.

6. Learn from various sources (professional journals, textbooks, the Internet and the community) and reconstruct previously learned knowledge.

7. Develop a more positive and enthusiastic attitude about life science.

Course Philosophy:

The class involves discussion of major biological concepts, principles and generalizations interspersed with group activities addressing science as a process. In order for teachers to use this approach in their own teaching, they must become thoroughly comfortable with it through their own learning.

We also try to integrate various subject areas such as math, language, and social studies in the teaching/learning of science. Science is perhaps the best subject for the development of an integrated curriculum. I hope in this course you will become familiar with some of the ways in which this can be done.

Required Text(s) and Material:

No textbook is required for this course. All the readings, activities and assignments are in the course’s Blackboard site. However, I encourage you to download the course materials from the Blackboard site and organize them by topic in a 3-ring binder to study from. You are also required to organize all the materials in the Blackboard site into a CD ROM or USB Flash drive. I will go over your organized materials while you take the mid-term exam.

For additional information on the topics we cover you may check an on-line biology book by clicking on the following link (this link is also listed under “external links” on the course’s Blackboard site: (http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookTOC.html)

Policies:

Because each class meeting is almost three hours long, and so much material is covered in each meeting, it is essential that you attend each class to do well in the course. Attendance will be taken at the beginning of class. Absences will be excused under certain circumstances such as illness and death in the family when the student provides the instructor with evidence of such emergencies. Excused absences will be by notes from doctor or other relevant official. Absentees are responsible for: (1) getting any handouts passed out during the missed class, (2) any in-class
announcements, (3) changes in syllabus, and (4) material discussed in class. There will be no make-up of activities missed.

Please arrive to class on time. Class announcements are given at the beginning of class, which you will miss if arriving late. Late arrivals are also disruptive to everyone in class. PLEASE TURN OFF YOUR CELL PHONES BEFORE ENTERING THE CLASS AND STORE THEM AWAY.

Grading System:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Class Attendance and Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Two Exams (25% each)</td>
<td>50%</td>
</tr>
<tr>
<td>Concept Map</td>
<td>10%</td>
</tr>
<tr>
<td>Science Model</td>
<td>10%</td>
</tr>
<tr>
<td>Research Project</td>
<td>20%</td>
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<tr>
<td>Design and Presentation</td>
<td>10%</td>
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<tr>
<td>Final Report</td>
<td>10%</td>
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</tbody>
</table>

1. Class Participation, Readings, In-class Activities, and Homework: Consideration will be given to attendance, participation in class discussions and in-class activities, quality of homework and entries on the discussion board. Your attendance and promptness is important.

2. Course Assignments:

A. Concept Map: Choose a topic within life science and use the software Inspiration to draw a concept map that shows the interrelationships among its various concepts. Please refer to the guidelines and grading rubric provided for the assignment.

B. Science Model: Choose a topic or major concept covered in class and develop a model that can be used to help explain the topic/concept. Refer to the guidelines and grading rubric provided for the assignment.

C. Research Project: Given a research question and hypothesis within a life science topic, design and carry out an experiment that will allow you to test that hypothesis. Share the results of your experiment with others through a Power Point Presentation and write a final report using the guidelines provided for the assignment. Please refer to the guidelines and grading rubric provided for all the aspects of this assignment.

D. Exams: There will be two exams in this course. The examinations are a combination of multiple-choice, short answer, and essay items. The material for each examination will include items from class activities, handouts, and articles assigned for reading. The second exam will cover only the biological concepts and activities presented after the first exam. A study guide will be available before each exam.

Things to keep in mind:

- The instructor will provide criteria and a grading rubric for each assignment. These
criteria are located under “Assignments” in the course’s Blackboard site and should be used as guidelines for what the instructor expects in each assignment.

- Assignments may be submitted electronically to the blackboard site before class begins on the date the assignment is due or turned on the due date at the beginning of class.

- Late assignments will decrease in point value by 5% up to a maximum of 30% of the allocated points for each day the assignment is late.

- To meet professional quality and presentation standards required of practicing teachers, assignments will be graded on clarity of ideas, grammar, spelling, and adequate word choice. Assignments must be typed on a word-processor.

Plagiarism
Plagiarism includes copying material (any more than 5 consecutive words) from outside texts or presenting outside information as if it were your own by not crediting authors through citations. It can be deliberate or unintended. If you're in doubt about the use of a source, cite it. Students caught plagiarizing information from other sources will receive a failing grade in the course. University policy states that students can be subject to multiple sanctions, from reprimand to expulsion as a consequence of academic dishonesty. To enforce this policy, all outside references must be submitted with assignments. Please read the handout titled “Plagiarism” under “Assignments” on the course’s Blackboard site.

Grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93-100 %</td>
<td>A</td>
</tr>
<tr>
<td>87-89%</td>
<td>B+</td>
</tr>
<tr>
<td>80-82 %</td>
<td>B-</td>
</tr>
<tr>
<td>73-76 %</td>
<td>C</td>
</tr>
<tr>
<td>67-69 %</td>
<td>D+</td>
</tr>
<tr>
<td>60-62 %</td>
<td>D-</td>
</tr>
<tr>
<td>Less than 60%</td>
<td>F</td>
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GENERAL NOTE ON GRADING
The College of Education faculty members strive to implement assessment measures that reflect a variety of strategies in order to evaluate a student's performance in a course. For undergraduates and post-degree students C grades will be awarded for satisfactory work that satisfies all course requirements; B grades will be awarded for very good work, and A grades will be reserved for outstanding performance. [For graduate students B grades will be awarded for satisfactory work that satisfies all course requirements; B+ grades will be awarded for very good work, and A grades will be reserved for outstanding performance.] Please note that there is a distribution of grades from A-F within the College of Education and that plus and minuses are recorded and distinguish distinct grade point averages.

WITHDRAWAL POLICY
Students who withdraw from a course after the end of the 10th week of class (Saturday, March 22) will receive a grade of WP, WF, or WN.

- WP will be awarded if the student is passing the course (based on work due to date) at the time the withdrawal is requested
WF will be awarded if the student is failing the course (based on work due to date) at the time the withdrawal is requested
WN will be awarded if no materials have been submitted, and so there is no basis for a grade

Students must submit their withdrawal request on-line through Pipeline. The faculty member must approve the withdrawal request before it becomes final, and students should continue to attend class until they receive notification via email that the withdrawal has been approved. Withdrawals can be requested at any point from the fifth week of class through the study day.

ATTENTION STUDENTS WITH DISABILITIES:
Wayne State University is committed to providing students with disabilities an equal opportunity to benefit from its programs, services, and activities. If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services’ mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible. http://studentdisability.wayne.edu/

ACADEMIC SUCCESS:
The Academic Success Center in the Adamany Undergraduate Library provides tutoring by appointment at no cost as well as training in areas such as time management, study and testing skills. Contact Info: Tel. 313/577-3165 Web. http://www.success.wayne.edu/ Do visit the Academic Success Center if you begin having difficulty in any of the courses you are taking.

RELIGIOUS OBSERVANCE:
Because of the large variety of religious affiliations the academic calendar makes no provisions for conflicts with religious holidays. However, it is University policy to respect the religious obligations of all members of the University community. Students with classes or examinations that conflict with religious observances are expected to notify their instructors in advance so that mutually agreeable alternatives can be worked out.

CLASS SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic Considered</th>
<th>Blackboard Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 9</td>
<td>Orientation</td>
<td>Syllabus</td>
</tr>
<tr>
<td></td>
<td>Concept Mapping</td>
<td>Handouts</td>
</tr>
<tr>
<td>Jan. 16</td>
<td>Science Processes – Research Project</td>
<td>Handouts</td>
</tr>
<tr>
<td></td>
<td>Classification</td>
<td>Handouts</td>
</tr>
</tbody>
</table>
The Kingdoms and their populace
Developing a classification key

Jan. 23 Animals vs. plants
Similarities/differences at the cellular level Handouts
*Homework Due: “Willie the Hamster”*

Jan. 30 Transport
Plants; Animals
* Design of Research Project Due*

Feb. 6 Photosynthesis/Respiration Handouts

Feb. 13 Excretion Handouts
*Concept Map due*

Feb. 20 Variation and Heredity Handouts

Feb. 27 FIRST EXAM
*Participation Folder Due*

March 6 Microbes (viruses, bacteria and fungi) Handouts
Benefits and harms
Economic impact

March 13 NO CLASS – SPRING BREAK

March 20 Producers and Consumers Handouts
Food chains/Food Webs
*Science Model Due*

March 27 Natural Resources Handout
Pollution

April 3 Role Playing: Environmental Issues Handouts
Campus field trip
*Homework Due: Field Trips*

April 10 Nutrition/Digestion Handouts
A Balanced Diet - Major Food Groups
Role of nutrients in the human body
Eating disorders
Digestion and absorption

April 17 Research Project
*Power Point Presentations Due*
Report on your research project due

April 24 FINAL EXAM (same time and place as class)
REFERENCES

The following list of science activity books, journals, and other resources will be useful to you as a teacher. Add to the list as you encounter additional ones and start a file for your future use. You will find it very useful once you become a teacher.

Science Education Journals

Science and Children
Science Scope
Science Teacher
Teaching K-8
Creative Classroom
Wonder Science

Community Resources


Michigan Department of Natural Resources. http://www.michigan.gov/dnr/
You will find many resources at this site.

Consider becoming a member of science organizations such as:

Michigan Science Teachers Association (MSTA) http://www.msta-mich.org/
Metropolitan Detroit Science Teachers Association (MDSTA) http://www.mdsta.org/
National Science Teachers Association (NSTA) http://www.nsta.org/

Books


Thier, H.D. et. al. (1978). *The Science Curriculum Improvement Study (SCIS)* (see K-6 modules on Organisms, Life Cycles, Populations, Environments, Communities, and ecosystems).

