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| SCHOLARLY | ETHICAL | REFLECTIVE | VALUE DIVERSITY | EXPERIENCED

**LEAD** and **SERVE** constitute the conceptual framework for all programs for professional educators in the College of Education at NC State. They are the touchstones that assure that our students graduate with the following:

- ❖ **LEAD:** four forms of knowledge; general pedagogy, content-specific pedagogical strategies, content or discipline knowledge as well as knowledge of the content of education, including foundations, historical perspectives and school settings.
- ❖ **SERVE:** elements that show the range of skills and dispositions developed in our candidates; scholarly, ethical, reflective, valuing diversity and experienced in practical application of knowledge.

## **COURSE INFORMATION**

**Course Prefix and Title:** ELM 420: *Teaching Science in the Intermediate Grades*

**Course Catalog Description:** ELM 420 is designed to prepare teacher candidates to teach science in intermediate grades (grades 3-6) and leads to licensure in the elementary grades. Specific methodologies that relate to the theory and practice of teaching science will be explored and examined.

**Number of credits:** 3

**Date Syllabus was Revised:** January 2006 and August 2008

**Course Prerequisites/Co-requisites:** Successful completion of ELM 320 and ELM 375 and admission to the Elementary Education Teacher Education Program. Senior Standing.

**Day/Time:** Wednesdays: **8:30-11:15 (sec. 030); 12:00-2:45 (sec. 031)**

**Class Location:** Poe 220

### **Instructor Information:**

Name: Dr. James Minogue

Email: james\_minogue@ncsu.edu

Office location: Poe Hall Room 317-E

Office phone and/or other contact information: 919.513.3317

Office Hours: Mon. & Fri. 11:30-2:30 (otherwise by appointment)

### **Required Text/Resources:**

Harlen, W. (2001). *Primary science: Taking the plunge*. Portsmouth, NH: Heinemann.  
ISBN 978-0-325-00386-3 / 0-325-00386-6

### **Electronic Resources:**

You are not required to print any of the below referenced documents. They are course resources for you as you and we will access them periodically throughout the semester:

NCSU's Moodle site: <http://moodle.wolfware.ncsu.edu/>

North Carolina Department of Public Instruction (NCDPI) Essential Standards:  
<http://www.ncpublicschools.org/acre/standards/>

Learn NC: <http://www.learnnc.org/>

National Research Council (1996). *National Science Education Standards*. Washington D.C.: National Academy Press. Full Text available @:  
<http://www.nap.edu/readingroom/books/nses/html/overview.html>

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy: A Project 2061 report*. New York: Oxford University Press. Full Text available @:  
<http://www.project2061.org/tools/benchol/bolintro.htm>

Michaels, S., Shouse, A. W., & Schweingruber, H. A. (2007). *Ready, Set, Science!: Putting Research to Work in K-8 Science Classrooms*. Washington, DC: National Academies Press. Full text available @:  
[http://www.nap.edu/catalog.php?record\\_id=11882](http://www.nap.edu/catalog.php?record_id=11882)

National Research Council (2005). *How Students Learn Science*. Washington D.C.: National Academy Press. Full Text available @:  
<http://www.nap.edu/openbook/0309089506/html/index.html>

National Science Teachers Association: <http://www.nsta.org>

The North Carolina Science Teachers Association (NCSTA): <http://www.ncsta.org/>

### **Additionally, you will need:**

- A computer with a word processing program and access to the Internet.
- Transportation to the field site.
- A large 3-ring binder for course hand-outs and other materials

### **Course Objectives:**

Upon completion of this course, the student will be able to:

1. Locate, evaluate, and utilize science education resources such as trade books, research reports, electronic media, and community resources in the teaching of science.  
Standards Alignment: LEADSERVE 1, 2, 3, 4, & 9; NCPTS III & IV; NCDPI-SP 3
2. Describe and apply the science curricula (state and national) for grades 3-6.  
Standards Alignment: LEADSERVE 1, 2, 3, & 4; NCPTS III & IV; NCDPI-SP 3
3. Design and deliver science lessons that enable children to build sound understandings of core science concepts.  
Standards Alignment: LEADSERVE 1, 2, 3, 4, 7 & 9; NCPTS II, III, & IV; NCDPI-SP 3, 7, 10, & 15
4. Design lessons that teach integrated science process skills and the nature of science.  
Standards Alignment: LEADSERVE 2 & 3; NCPTS II, III, & IV; NCDPI-SP 3 & 10

5. Explain how the learning cycle approach can be used to teach elementary school science.

Standards Alignment: LEADSERVE 2, 3, & 5; NCPTS II, III, & IV; NCDPI-SP 3 & 10

6. Understand the relationships between student thinking, conceptual development, and opportunities to learn science for grade 3-6 students.

Standards Alignment: LEADSERVE 2, 3, & 5; NCPTS II, III, & IV; NCDPI-SP 3 & 7

7. Utilize strategies in instruction that promote student development and skills that contribute to an awareness of the relationship of science to personal health and welfare.

Standards Alignment: LEADSERVE 2 & 3; NCPTS I, II, III, & IV; NCDPI-SP 3, 5, & 13

### **Key:**

LEADSERVE: College of Education Conceptual Framework

[http://ced.ncsu.edu/about/conceptual\\_framework.htm](http://ced.ncsu.edu/about/conceptual_framework.htm)

NCPTS: North Carolina Professional Teaching Standards

<http://www.ncptsc.org/Final%20Standards%20Document.pdf>

NCDPI-SP: North Carolina (DPI) Standards for Elementary Teachers

<http://www.dpi.state.nc.us/docs/ihe/materials/specialtystandards.pdf>

### **Teaching Strategies:**

A balance of class discussion, group work, reflection, field work, inquiry activities, and direct instruction will be employed.

### **Grading Methods and Criteria:**

- Minor Take-home assignments & projects (e.g. Read & Reacts, Discrepant Events, Web Resource Evaluation): 30%
- In-class activities (e.g. projects, textbook readings...): 30%
- Mid-term project: 10%
- Final project: 25%
- Daily Participation & Professionalism: 5%

### **Major Take-home Assignments/Projects:**

In addition to the readings from the textbook and selected articles, the core take-home assignments include:

1. Read & Reacts (4): **Due: 1/18, 2/22, 4/4, 4/25**
2. Discrepant Events: **Due: 2/1**
3. Final Project- Field-based Inquiry Proposal: **Due 2/29**
4. Mid-Term Project: Informal Science Ed. Activity: **Due on or before: 3/14**
5. Evaluating Web Resources: **Due 4/18**
6. Final Project: Field-based Science Education Inquiry - **Due on or Before: 5/7**

**Explicit details regarding each of the above assignments will be provided as the semester progresses.**

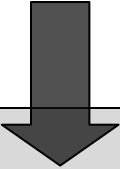
The standard NCSU plus/minus grading system will be followed.

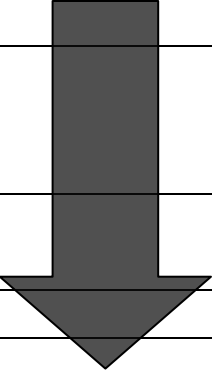
Letter Grade	Points needed	What this grade means
A+	97 points	Demonstrated the highest level of mastery of concepts, including the ability to apply many of these concepts to real situations
A	93 points	
A-	90 points	
B+	87 points	Demonstrated mastery and ability to apply at least some of these concepts to real situations
B	83 points	
B-	80 points	
C+	77 points	Demonstrated mastery of basic concepts
C	73 points	
C-	70 points	
D+	67 points	Demonstrated minimal mastery of topics
D	63 points	
D-	60 points	
F	< 60 points	Failed to demonstrate mastery of any topics

**Brief and Tentative Calendar (Topics & Sequence is subject to change):**

[**Disclaimer:** What follows is a tentative outline of the topics we will cover & when. The weekly calendar can and most likely will change. Rest assured that I will keep you well informed as to my weekly instructional plan, assignments, and expectations. Due dates for the major assignments will not change.]

Day/Meeting #	Tentative Topics/Activities	Assignment(s)
Wed. Jan. 11 1	<ul style="list-style-type: none"> <li>• Views of Science Teaching &amp; Learning</li> <li>• Course Pre-assessment</li> <li>• Science Teaching Concerns</li> <li>• Course Logistics</li> <li>• Science Kit Explorations</li> </ul>	<p>a) Read the course syllabus  b) Get the textbook &amp; read the Introduction (<i>ix-xiii</i>)  c) <b>Read &amp; React:</b> <i>30 Tips for Effective Teaching</i>-<b>Due 1/18</b></p>
Wed. Jan. 18 2	<ul style="list-style-type: none"> <li>• What Does Good K-6 Science Look Like?</li> <li>• The Nature of Science (NOS)</li> <li>• Start work on Discrepant Events</li> </ul>	<p>a) Read Ch. 1: <i>Why Science? What Science?</i>-<b>Due 1/25</b>  b) Discrepant Event- <b>Due 2/1</b></p>
Wed. Jan. 25 3	<ul style="list-style-type: none"> <li>• Ch. 1 Assessment</li> <li>• What is Inquiry?</li> <li>• Introduce <i>Final Project: Field-based Inquiry</i></li> <li>• Cookbook Conversions</li> <li>• Standards Jigsaw</li> </ul>	<p>a) Read Ch. 2: <i>Bringing Science &amp; Children Together ...</i>-<b>Due 2/1</b>  b) Discrepant Event- <b>Due 2/1</b>  c) Field-based Inquiry Proposal- <b>Due 2/29</b>; Presentations- <b>Due- 5/2</b>;  Final Project-<b>Due 5/7</b></p>
Wed. Feb. 1 4	<ul style="list-style-type: none"> <li>• Ch. 2 Assessment</li> <li>• Discrepant Event presentations</li> <li>• Extending Discrepant Events</li> </ul>	<p>a) Read Ch. 3: <i>The Right Question...</i>-<b>Due 2/8</b>  b) Field-based Inquiry Proposal- <b>Due 2/29</b>; Presentations- <b>Due- 5/2</b>;  Final Project-<b>Due 5/7</b></p>
Wed. Feb. 8 5	<ul style="list-style-type: none"> <li>• Ch. 3 Assessment</li> <li>• Sinking &amp; Floating-The Right Questions...</li> <li>• Shipwrecked Sally</li> </ul>	<p>a) Read Ch. 5: <i>Taking Children's Ideas Seriously</i>-<b>Due 2/22</b>  b) <b>Read &amp; React:</b> <i>After I Gave Students Their Prior Knowledge</i>-<b>Due 2/22</b>  c) Field-based Inquiry Proposal- <b>Due 2/29</b>; Presentations- <b>Due- 5/2</b>;  Final Project-<b>Due 5/7</b>  d) <b>Mid-Term:</b> Informal Science Education Activity write-up-<b>Due on or before 3/14</b></p>

Day/Meeting #	Tentative Topics/Activities	Assignment(s)
Wed. Feb. 15	No class-Redirect Week # 1	<p>a) Read Ch. 5: <i>Taking Children's Ideas Seriously</i>-Due 2/22</p> <p>b) <b>Read &amp; React:</b> <i>After I Gave Students Their Prior Knowledge</i>-Due 2/22</p> <p>c) Field-based Inquiry Proposal- Due 2/29</p> <p>d) <b>Mid-Term:</b> Informal Science Education Activity write-up-Due on or before 3/14</p>
Wed. Feb. 22 6	<ul style="list-style-type: none"> <li>• Ch. 5 Assessment</li> <li>• Reports from the Field</li> <li>• Animal Classification</li> <li>• Formative Assessment Probes</li> </ul>	<p>a) Read Ch. 6: <i>Helping Children to Plan...</i>- Due 2/29</p> <p>b) <b>Mid-Term:</b> Informal Science Education Activity write-up-Due on or before 3/14</p> <p>c) Field-based Inquiry Presentations- Due- 5/2; Final Project-Due 5/7</p>
Wed. Feb. 29 7	<ul style="list-style-type: none"> <li>• Ch. 6 Assessment</li> <li>• <i>Mystery Powders</i></li> <li>• Consumer Reports Wants You!</li> </ul>	<p>a) Read Ch. 7: <i>Helping Children to Observe...</i>-Due 3/14</p> <p>b) <b>Mid-Term:</b> Informal Science Education Activity write-up-Due on or before 3/14</p>
Wed. Mar. 7	No Class-NCSU Spring Break	
Wed. Mar. 14 8	<ul style="list-style-type: none"> <li>• Ch. 7 Assessment</li> <li>• Mid-term Sharing</li> <li>• Lemon of a Lesson</li> <li>• Science &amp; Children Roundtables</li> </ul>	<p>a) Read Ch. 8: <i>Helping Children Communicate</i>-Due 4/4</p> <p>b) <b>Read &amp; React:</b> <i>Enhancing the Conceptual Learning of Science</i>- Due 4/14</p> <p>c) Evaluating Web Resources-Due 4/18</p> <p>d) Field-based Inquiry Presentations- Due- 5/2; Final Project-Due 5/7</p>
Wed. Mar. 21 9	<p>Grey Cohort: No class-Redirect Week # 2</p> <ul style="list-style-type: none"> <li>• Infusing Technology</li> </ul>	<p>a) Read Ch. 8: <i>Helping Children Communicate</i>-Due 4/4</p> <p>b) <b>Read &amp; React:</b> <i>Enhancing the Conceptual Learning of Science</i>-Due 4/14</p> <p>c) Evaluating Web Resources-Due 4/18</p>
Wed. Mar. 28 9	<p>Scarlet Cohort: No class-Redirect Week # 2</p> <ul style="list-style-type: none"> <li>• Infusing Technology</li> </ul>	<p>d) Field-based Inquiry Presentations- Due- 5/2; Final Project-Due 5/7</p>

Day/Meeting #	Tentative Topics/Activities	Assignment(s)
Wed. Apr. 4 10	<ul style="list-style-type: none"> <li>• Ch. 8 Assessment</li> <li>• Tackling the Invisible</li> <li>• Model-based Inquiry</li> <li>• Science Notebooks</li> </ul>	a) Read Ch. 9: <i>Assessing for Learning</i> -Due 4/11 b) Evaluating Web Resources-Due 4/18 c) Field-based Inquiry Presentations- Due- 5/2; Final Project-Due 5/7
Wed. Apr. 11 11	<ul style="list-style-type: none"> <li>• Ch. 9 Assessment</li> <li>• Two-tiered Assessments</li> <li>• Concept Mapping</li> <li>• Analogies</li> </ul>	a) <b>Read &amp; React:</b> <i>Shifting from Activitymania</i> - Due 4/25 b) Evaluating Web Resources-Due 4/18 c) Field-based Inquiry Presentations- Due- 5/2; Final Project-Due 5/7
Wed. Apr. 18 12	<ul style="list-style-type: none"> <li>• Web Resource Sharing</li> <li>• Science Kit/Module Work</li> </ul>	a) Field-based Inquiry Presentations- Due- 5/2; Final Project-Due 5/7
Wed. Apr. 25 13	<ul style="list-style-type: none"> <li>• Science Kit/Module Work</li> <li>• Course Post-assessment</li> </ul>	
Wed. May. 2	<ul style="list-style-type: none"> <li>• Field-based Inquiry Presentations</li> </ul>	

# IMPORTANT INFORMATION

## Attendance Policy

Candidates in the NCSU Elementary Education Program are part of a community of pre-service educators who LEAD and SERVE in both the university setting and in the public schools. Candidates are no longer traditional college students and therefore are expected to exhibit professional behavior, which will lead to preparation for employment.

Professional behavior includes attendance at all classes and internship sessions. If candidates will miss class, they should call the instructor's voicemail and leave a message indicating a reason for the absence and a phone number where they can be reached. The reason for the missed class may or may not be considered an excused absence. The university policy on what constitutes an **excused** absence follows:

## Excused Absences

Only three excused absences will be permitted for any course (Read below 2.2.7 to address what happens if there are more than three excused absences). Students shall receive excused absences for the following.

### Anticipated Absences.

Excuses for anticipated absences must be cleared with the instructor before the absence. Examples of anticipated situations where a student would qualify for an excused absence are:

2.1.1. The student is away from campus representing an official university function, e.g., participating in a professional meeting, as part of a judging team, or athletic team. These students would typically be accompanied by a University faculty or staff member.

2.1.2. Required court attendance as certified by the Clerk of Court.

2.1.3. Religious observances as verified by Student Organization Resource Center (1202 Talley Student Center, 515-3323). For more information about a variety of religious observances, visit the Diversity Calendar.

2.1.4. Required military duty as certified by the student's commanding officer.

*Other anticipated absences can be determined through negotiations with the professor.*

Emergency Absences. Excuses for emergency absences must be reported to the instructor as soon as possible, but not more than one week after the return to class. Examples of emergency absences are:

2.2.1. Illness or injury when certified by an attending physician. Physicians on the Student Health Service staff do not provide written excuses. Because of student confidentiality, information can only be released directly by the Counseling Center or Student Health Services in case of crisis or with the student's written authorization.

If you are ill and must miss class, you must have a written doctor's note in order for the illness to be excused.



2.2.2. Death or serious illnesses in the family when documented appropriately. An attempt to verify deaths or serious illness will be made by Student Organization Resource Center (1202 Talley Student Center, 515-3323) at the request of the instructor.

When excused absences are accepted, the instructor shall hold all students with excused absences to the same standard for making up missed assignments or examinations. (*See below for policies on make-up assignments for Elementary Education students.*)

2.2.7. In a case where the student realizes that the anticipated number of absences will exceed the number of excused absences permitted in the course, the student shall discuss the situation with the instructor, the student's adviser, or the academic dean in the college in which the student is enrolled. It is anticipated that a suitable resolution shall occur before the end of the second week of the semester.

## Unexcused Absences

An unexcused absence is any absence that does not fall in one of the above cases (anticipated absences negotiated with the professor or excused absences such as illness, death, or unanticipated events for which there is evidence). Points will be deducted from the Participation & Professionalism portion of the course grade.

## Incomplete Grades

Any incomplete grade not removed by the end of the following regular semester in which the student is enrolled or by the end of twelve months, whichever is shorter, or by the extended deadline authorized by the instructor or department offering the course and recorded by the Department of Registration and Records, will automatically become an F grade and will count as a course attempted.

## Late Submission of Assignments

If a student has an excused reason for turning in an assignment late (excused is defined as in examples above), they will not be penalized if the assignment is turned in within one week of the due date.

**If the late assignment is *unexcused*, it will result in an automatic 10% reduction in the grade on that assignment. The late assignment must be turned in within one week. If it is not, 10% points will be deducted for every week the assignment is not turned in.**

## Class Participation & Professionalism

Professionalism includes meeting all obligations and assignment requirements as well as acting responsibly, respectfully, and professionally in classes and in the public schools. It means taking an active part in discussions and course activities. It means displaying the sort of attitude you want your own future students to exhibit. Thus 5% of your grade for this course will be determined by your participation. This will include engagement in class activities and attitudes. It is, in part, a subjective grade, so be sure your professor knows you are actively involved.

## Academic Integrity

Students are bound by the academic integrity policy as stated in the code of student conduct. Therefore, students are required to uphold the university pledge of honor and exercise honesty in completing any assignment. See the website for a full explanation:

[http://www.ncsu.edu/policies/student\\_services/student\\_discipline/POL11.35.1.php](http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php)

*Avoiding Plagiarism.* Plagiarism is intentionally claiming that another person's work is his/her own or implying that another person's work is his/her own (through inadequate or inaccurate citations of reference material.) Students:

- Should not copy whole portions of text from another source as a major component of papers or projects.

- Should identify the title, author, page number/webpage address, and publication date of works when directly quoting small portions of texts, articles, interviews, or websites.
- Should appropriately identify the source of information when paraphrasing (restating) ideas from texts, interviews, articles, or websites.
- Should follow the guidelines of the American Psychological Association Style Guide when referencing all research sources.

For further information about the consequences of academic dishonesty please consult:

<http://www.provost.ncsu.edu/copyright/plagiarism/> and/or  
[http://www.ncsu.edu/stud\\_affairs/osc/AIpage/cheatingpolicy.html](http://www.ncsu.edu/stud_affairs/osc/AIpage/cheatingpolicy.html)

### **Disability Services**

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653.

[http://www.ncsu.edu/provost/offices/affirm\\_action/dss/](http://www.ncsu.edu/provost/offices/affirm_action/dss/)

For more information on NC State's policy on working with students with disabilities, please see

[http://www.ncsu.edu/policies/academic\\_affairs/courses\\_undergrad/REG02.20.1.php](http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.1.php)

### **OTHER IMPORTANT INFORMATION**

A complete list of reminders for the beginning of the semester can be found at

[http://www.ncsu.edu/provost/academic\\_regulations/beg\\_of\\_semester.html](http://www.ncsu.edu/provost/academic_regulations/beg_of_semester.html)

**All ELM students must maintain and use their NCSU email account.**

Help for taking and passing PRAXIS I and II is available in the College of Education Learning Technology Resource Center located in room 400 of Poe Hall. PRAXIS registration information, study guides, etc. are found at [www.ets.org/praxis](http://www.ets.org/praxis) Information on CED Teacher Education is found at

<http://ced.ncsu.edu/teachered>

The College of Education's Conceptual Framework may be found in its entirety at

[http://ced.ncsu.edu/about/conceptual\\_framework.htm](http://ced.ncsu.edu/about/conceptual_framework.htm)

### **Class Evaluations**

Online class evaluations will be available for students to complete during the last 2 weeks of spring and become unavailable before finals begin.

Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will not know how any one student responded to any question, and students will not know the ratings for any instructors.

Evaluation website: <https://classeval.ncsu.edu/>

Student help desk: [classeval@ncsu.edu](mailto:classeval@ncsu.edu)

More information about ClassEval: <http://www.ncsu.edu/UPA/classeval/>