Advanced Science Methods for Elementary Teaching – EDCI 634
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I. Description
A. EDCI 634: Advanced Science Methods for the Elementary Classroom
B. Prerequisites: Science Methods for the Elementary Classroom (EDCI 631).
C. The emphasis of this masters level course is on inquiry; extensions of theoretical understanding of how children learn; development of personal expertise in teaching, assessment; incorporation of technology, safety, and issues related to the nature and meaning of science. Activities are project based and link the students’ inclass learning experiences with students’ day-to-day teaching activities and experiences.


III. Rationale and Contribution to Overall Program
This course is part of the GMU-GSE M.Ed. elementary masters program. Primary contributions of this course to program goals are in the areas of teacher as reflective professional, advanced development of pedagogy and philosophy, and knowledge of children. Secondary contributions to program goals are in the general areas of inquiry and nature of understanding (and science).

IV. Course Goal and Learning Outcomes, and Standards
A. Overall Course Goal: Extend the abilities of the students to teach science effectively in their classroom based on practical and theoretical premises.
B. Learning Outcomes (coded to NBPTS, NETS, & NSES – next page):
   1. Explore personal teaching experiences, contemporary theory, and practical applications related to students’ science concept development and basic understanding of the nature of science.
   2. Develop competence in maintaining a safe classroom environment that facilitates hands-on and inquiry-oriented science including a classroom safety plan.
   3. Expand science content-specific pedagogies using models, technology, simulations, and conceptual change oriented instructional strategies.
   4. Extend personal reflective practices and develop skills in problem solving and inquiry into day-to-day teaching and assessment events in classroom via action research, analysis of personal videotapes, and reflection.
   5. Use the Virginia Standards of Learning and the National Science Education Standards as guidelines and organizers for lesson and unit development related to issues of gender and children with exceptionalities.
   6. Develop proficiency and advanced understanding in a variety of assessment strategies to provide formative and summative information within the frame-of-reference of unit planning, general instruction, etc.
Learning Outcomes referenced by select standards

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<tr>
<th>Course Learning Outcome (Item B above)</th>
<th>NABPT Core Proposition (total of 5 elements bulleted in original document, arbitrarily number 1–5 here)</th>
<th>ISTE National Educational Technology Standards (NETS) (total of six elements, I – VI)</th>
<th>National Science Education Standards from “Professional Development for Teachers of Science (total of 4 standards), p 55-73</th>
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V. Texts and Reference Materials

A. Texts


National Science Education Standards (http://www.nrc.edu) and Virginia Standards of Learning (http://www.knowledge.state.va.us)

Course Readings (e-reserves), handouts, and e-mailed attachments

B. Other Useful Reference Texts


Koch, J. (1999). *Science stories: Teachers and children as science learners*
VI. Course Requirements

A. Student Performance and Products

1. Class Schedule and Attendance: Class meets at scheduled times unless a special need for field trips or guests arises.

2. Major Products (and percent of final grade)

   a. **Create team lesson plans** using 5E learning cycle model described in *Science & Children, 40*(4) p 45. (Objectives 1, 3, 4, 5) 20% of grade

   b. **Inquiry into teaching & learning** -- videotaping and collaborative peer work. Videotape yourself once early in the semester. Meet with your “respected peer” and identify an action plan for the semester to enhance your “expertise” (using the classroom observation rubric as a referent) in teaching. Peer teams to share interim and final reports with the class (written—after completing the second video). (Outcomes 3, 4, 5, 6) 20% of grade

   c. **Key points review**: Students (in teams or individually) will provide an analysis of weekly course readings. This analysis will include a 150 word abstract and the listing of 4 to six focus questions including theoretical and practical considerations. (Outcomes 1, 3, & 4) 10% of grade

   d. **Complete a case study** using an action research orientation based on *Case Studies in Elementary Science: Learning from Teachers* by Ann C. Howe and Sharon E. Nichols p. 115 and *Cases in Middle and Secondary Science Education: The Promise and Dilemmas* by Thomas R. Koballa, Jr. and Deborah J. Tippins, Chapter 12. Each student will also write a case analysis and interpretation of a class colleague’s case. Students’ cases will be referenced using APA format. (Outcomes 1 – 6) 30% of grade

   e. **Presentation** of video inquiry into teaching and learning or peer analysis of the case study. 10% of grade

   f. Participation: In class “pop quizzes,” reflections, and special events including the “safety letter contest” will be used as a strategy to promote participation, continued reflection, and provide formative mechanism for “fine tuning” of the course during any given semester.” (Outcomes 1 - 6) 10% of grade
B. Evaluation of Student Performance

1. Grading for larger projects such as the curriculum development assignment and the inquiry into teaching and learning will include the use of rubrics and outlined criteria based on elements of the assignment, presentation, clarity, and content. In other instances, evaluations will be more open-ended and/or may be co-generated with the students.

2. Grading will be done on a percentage basis and will be defined generally by the criteria outlined below.

   a. Grading: Components of the final grade will be based upon quizzes, written discussions of research based literature, presentations and analyses of teaching and learning, and the final case-based action research project.

   i. The class will be graded using letter grades (A - F). A = ≥ 94%; A- = ≥ 90%; B+ = ≥ 87%; B = ≥ 80%; C = ≥ 70; F < 70%

   b. Grade Definitions: All students are expected to complete all assignments, attend all classes, and participate fully. Because of the collaborative nature of this class, missing even one session may put students at a disadvantage regarding understanding the course subject. Consider your priorities. In doing so, these grade definitions should be used as guides.

   i. “A” An “A” indicates that a student is extremely well qualified as evidenced by exceptional performance in all aspects of the class with the crowning piece being the action research case study. This student shows excellence and thoroughness in planning, interacting with students, command of subject matter, and discusses issues and research in science education. All of these have been well demonstrated by an active participation in class sessions.

   ii. “B” A “B” indicates that this student has done a competent job of demonstrating abilities in planning, interacting, and dealing with issues in science education. This individual has a good grasp of the subject matter, can implement effective lessons, and is a reflective teacher. However, in speaking, analyzing, and writing about teaching, the individual is inconsistent, lacking in one or more areas of depth of understanding and mastery of the research/practice interface.

   iii. “C” A “C” is earned by a person who has not demonstrated sufficient competence in a variety of the above priorities at the graduate level.

   iv. “F” An “F” is earned by a person who has met few or none of the minimum competencies and class priorities.

3. Schedule of assignments: The schedule for assignments is optimized

   1) for the students’ and instructor’s time management;
   2) to take full advantage of prior readings and class discussions;
   3) for special “events” during the spring term such as vacations?

4. Late Assignments” If a request for an extension is made at least 3 days in advance
of the due date, a one week extensions may be granted “free-of-charge;” however, after 7 days the value of the assignments deteriorates at the rate of 2%/day. Requests inside the three-day limit are negotiated individually, given the circumstances, but may cost the student a few percentage points of the total score. Extenuating circumstances are handled on a case-by-case basis.

C. Policy on Incompletes: If circumstances warrant, a written request for an incomplete must be given to the instructor of record for approval prior to the course final examination date. Requests are accepted at the instructor’s discretion provided your reasons are justified and that a major percentage of your work has already been completed. Your written request must specify the date for completion of work and will be regarded as a contract between you and the instructor. This date must be at least two weeks prior to the university deadline for changing incompletes to letter grades.

D. Process and timeline for monitoring and advising students on their progress

1. Feedback is continuous in both informal settings (e.g., instructor join into various cooperative group discussions and inquires and discussion of strengths and challenges after students have completed model teaching activities) and formal settings (e.g., instructor assessment and evaluation of class projects)

2. Projects and assignments distributed during the term so those students have an ongoing sense of progress and success.

VII. UNIVERSITY POLICIES

The university has a policy that requests students to turn off pagers and cell phones before class begins.

HONOR CODE

To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of George Mason University and with the desire for greater academic and personal achievement, George Mason University has set forth a code of honor that includes policies on cheating and attempted cheating, plagiarism, lying and stealing. Detailed information on these policies is available in the GMU Student Handbook, the University Catalog, of the GMU website at www.gmu.edu.

INDIVIDUALS WITH DISABILITIES POLICY

The university is committed to complying with the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 by providing reasonable accommodations for applicants for admission, students, applicants for employment, employees, and visitors who are disabled. Applicants for admission and students requiring specific accommodations for a disability should contact the Disability Resource Center at 993-2474, or the University Equity Office at 993-8730.
ATTENDANCE POLICY

Students are expected to attend the class periods of the courses for which they register. Although absence alone is not a reason for lowering a grade, students are not relieved of the obligation to fulfill course assignments, including those that can only be fulfilled in class. Students who fail to participate (because of absences) in a course in which participation is a factor in evaluation, or students who miss an exam without an excuse, may be penalized according to the weighted value of the missed work as stated in the course syllabus (GMU University Catalog, pg. 32).