
EDCI 370 Curriculum and Instruction in Secondary Education: Science Fall 2005

William G. Holliday, Professor, Room 2226, Benjamin Building, Department of Curriculum and Instruction, University of Maryland at College Park, office hours, Tuesday 2:00 to 4:00 PM. (other hours by appointment)

Email me at holliday@umd.edu, or Telephone (number provided in class) me at home in emergencies. (My practice is to always return phone calls.)

Leave messages and your telephone number.

Email or phone me and leave a message before 10:30 AM on class meeting days, that you anticipate being absent or late.

A. General Course Information

Assignments must be presented on time and in a professional manner, and written in your own words. They must be verbally coherent, precise, concise, convincing and consistent with the guidelines specified in class. Each paper and other assignments should be written at the junior-senior level of university competency and in terms of the teachings of this course. University of Maryland (College Park) policies apply to student conduct.

You must submit all assignments in non-electronic paper form (except where noted in this document or as arranged), on time and in reasonable condition to receive a passing course grade. Exceptions with prior notification and approval will be considered. If late assignments are accepted and graded, students will not have an opportunity to rework their assignment and will receive lower assignment grades because of the fairness issue to other students submitting papers on time. Generally, late assignments are not accepted beyond seven days, 4:15 PM, schedule Tuesday class. Deadlines for assignments will be presented in class.

In compliance with and in the spirit of the Americans With Disabilities Act (ADA), I would like to work with you if you have a documented disability that is relevant to your work in this course. If you wish to discuss academic accommodations, you need to contact me by the end of the second class period.

Your participation is a vital aspect of this course. Please bring to my attention ahead of time any conflict between class meeting times and other University recognized commitments (e.g., religious observations), so that additional arrangements can be made. In this regard, you need to contact me by the end of the second class period in order to make such arrangements.

I will provide written feedback at intervals throughout the course based on the quality of your contributions in class and the thoughtfulness of your written work. I will also take into account your own assessment of your professional development as it relates to this course.

Grades are calculated using points in the following manner, and in accordance to University of Maryland policy. Grades generally are calculated as follows: A = 100 to 90, B = 89 to 80, C = 79 to 70, D = 69 to 60, F = 59 and below.

B. Details Concerning Assignments and Course Goals

Value of assignments:

Teaching science topic = 20 %, Curriculum plan and rationale = 20 %, NCATE assignment = 20 %, Readings-discussion test = 20 %, Science test = 10 %, Mathematics test = 10 %.

Curriculum plan and rationale (20%). Develop a year-long science curriculum of your choosing (twelve-grade, physics course, middle-ability students, limited resources available). Outline the topics that you would include in your curriculum and estimate the number of days needed to cover each topic (e.g., natural selection-evolution, structure of the atom, force) in a two-semester science course. Second, describe how you might teach selected topics in your curriculum. Third, provide a rationale for your curriculum.

Teaching a science topic (20 %). Each student will illustrate how to teach an approved science topic from curricular materials often used by ordinary science teachers such as selected textbook-based programs popular with ordinary science teachers and published by such corporations as Harcourt, Houghton Mifflin, McGraw-Hill or Pearson publishers. Importantly, students are neither limited nor obligated to use such materials. Selected university-authored materials are equally acceptable. Presenters' peers will assist presenters. Each presentation will include a great deal of interaction between the teacher and students. Presentation and discussion-time requirements will be described in class. For example, each presenter will spend 5 to 8 minutes providing explicit instruction by describing scientific information. In addition, each presenter will spend 7 to 10 minutes providing implicit instruction embedded in a laboratory session. This portion of the course will be graded by the instructor with student peers listening and interacting with presenters. Students in the class will complete a form assessing each presentation, in terms of the following criteria: apparent preparation, and presentation effectiveness. This data will be considered by the instructor. Completed forms by the class on the days of presentations represent a required component of this assignment.

NCATE assignment (20%). Presentation portion: Students in groups will chose a single standard from among the ten standards described in the 2003 *Science Teacher Preparation* document. Each group of 1 to 3 students will describe their chosen standard in a presentation in terms that are understandable and useable to their peers, recommend specific ways students in class can provide specific evidence concerning selected standard-competences and assist their peers later in presenting such evidence in an individual report submitted by each student in class. Presentation and discussion-time requirements will be described in class. This portion of the course will be graded by the instructor with student peers listening and interacting with presenters. Students in the class will complete a form assessing each presentation, in terms of the following criteria: apparent preparation, and presentation effectiveness. This data will be considered by the instructor. Completed forms by the class on the days of presentations represent a required component of this assignment.

Report portion of the NCATE assignment. Evidence of teacher competence report: Each student will prepare a ten-part report providing evidence of competence within each of the ten standard domains described in the 2003 *Science Teacher Preparation* document. These individual student reports will be examined and assessed by the groups originally in charge of particular standards with individual assessments forwarded to the instructor for his consideration. The instructor will assign grades to all work. These materials are appropriate for inclusion in your developing professional portfolios.

Readings-discussions linked to curriculum and instruction test (20 %). This test will employ a short-answer/essay, open-book format and cover information described in the readings and during class discussion. Sample items will be provided. Only legible papers will be graded.

Science gateway test (10 %). This test will assess your domain of expertise (i.e., chemistry).

Mathematics gateway test (10 %). This test will assess your competency in mathematics needed in high school science teaching.

C Programmatic Objectives

The intent of the teacher education program at UMCP is to prepare for a diverse society through research based professional programs. Our shared vision is consistent with our mission as a Research I institution that views **Research and Inquiry, Diversity, Collaboration, and Technology** as foundations to our conceptual framework. Reflective practitioners need to interact with many types of knowledge when they are making decisions in the world of practice. They need to use their **knowledge of subject matter**—their understanding of the facts or concepts within the domain of science as well as the ways in which the fundamental principles of science are organized. Reflective practitioners also need to draw frequently upon their **knowledge of curriculum**—their understanding of the programs and materials designed for the teaching of science at various elementary and middle school levels. They need to have **knowledge of learners**, including knowledge of student characteristics and cognitions as well as knowledge of motivational and developmental aspects of how students learn. Reflective practitioners need **knowledge of educational goals and assessment** of student progress, which contribute to instructional decisions. They also need **knowledge of social and cultural context** to understand how educational goals, learning, and their students interact with such social issues as racism and sexism and such cultural issues as diversity and economic inequalities. Finally reflective practitioners need **knowledge of pedagogy**—knowledge of pedagogical principles and techniques that are specific to mathematics and principles and techniques that are not bound by subject matter or topic.

Maryland Teacher Technology Standards

V. Integrating Technology into the Curriculum and Instruction

Indicators:

2. Evaluate technology materials and media to determine their most appropriate instructional use.

4. Use appropriate instructional strategies for integrating technology into instruction.
5. Select and use appropriate technology to support content-specific student learning outcomes.
7. Manage a technology-enhanced environment to maximize student learning.

D. On-Line Resources

1. American Association for the Advancement of Science (1993). Benchmarks for science literacy. New York: Oxford University Press.
Available online: <http://www.project2061.org/tools/benchol/bolframe.htm>
2. Prince George's County Public Schools:
Homepage: <http://www.pgcps.pg.k12.md.us/>
Science Office: <http://www.pgcps.pg.k12.md.us/science.html>
3. State of Maryland Voluntary State Curriculum (Science):
<http://mdk12.org/mspp/vsc/index.html>
4. National Research Council (1996). *National science education standards*. Washington, D.C.: National Academy Press. Read Chapter 3: Science Teaching Standards. Available online at
<http://www.nap.edu/catalog/4962.html>
5. National Research Council (2000). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*. Washington D.C.: National Academy Press. Available online at:
<http://www.nap.edu/catalog/9596.html>

E. Knowledge Base and Programmatic goals (Explanation of the Knowledge base, Philosophy for Preparation and Goals and Objectives of this preservice program designed for future secondary school science teachers)

Our science education program is embedded in programmatic standards consistent with the Maryland Professional Development Schools program. Thus our program consists of five general standards with accompanying implications for our internships, and the knowledge bases described in the Conceptual Framework for Teaching document is located in the Additional Appendices.

The first standard in our program is “Learning Community” In essence, we recognize and support the distinct learning needs of all partners. Thus, interns participate fully in the school community. Interns are placed in cohorts and reflect on their learning experiences with peers and the school community.

The second standard in our program is “Collaboration.” Our mission is to jointly define and mutually support each others’ institutions (e.g., University of Maryland and

professional developments schools where interns teach students science). We believe in planning together, incorporating concerns and suggestions into program improvements. Faculties in the science also are involved in teacher preparation.

The third standard in our program is “Accountability.” We accept the responsibility of upholding professional standards for preparing and renewing teachers in accordance with contemporary, research-based principles. Entrance and exit standards for interns are jointly defined. Final evaluations of interns are jointly developed.

The fourth standard in our program deals with “Organization, Roles and Resources.” Resources and time are allocated to support the continuous improvement of teaching and learning. We also believe that communication among all stakeholders is critical to successful teacher preparation programs.

The fifth standard in our program is “Equality.” We support equitable involvement of mentor teachers, interns and University of Maryland instructors, as well as equitable support of student outcomes. All interns are provided equitable access to an extensive internship. Interns work with students from diverse backgrounds. Interns support equity in the classroom. Experiences with special education services are an important part of the teacher education program.

The following is an outline of our conceptualization of knowledge bases reflected in our framework for teaching. That is, this outline provides a foundation for our science program at the secondary school level with respect to our knowledge bases and courses. The knowledge base of the secondary school science teacher preservice program is situated in the college of educations, “Conceptual Framework for Teaching,” listed in section F. Below are the courses as related to the knowledge bases. These bases are described in detail in the “Conceptual Framework for Teaching” document.

Knowledge of curriculum: EDCI 370/470, EDCI 463 (Teaching Reading in content Areas II).

Knowledge of subject matter: CORE: General Education, Double Major: life, chemistry, physics, or geology.

Knowledge of Pedagogy: EDCI 370/470, EDCI 463 (Teaching Reading in content Areas II).

Knowledge of learners: EDHD 413 (Adolescent development), EDHD 426 (Cognitive motion reading).

Knowledge of Educational Goals and assessment: EDPL 301 (Foundations of Education), EDCI 463 (Teaching Reading in content Areas II)

Knowledge of Social content: EDPL 301 (Foundations of Education), EDCI 370/470.