

## SME 700 Syllabus Spring 2003

### **Course Title: Science Curriculum in Public Schools**

Credit hours: 3

Course Description: An examination of elementary and secondary science curricula.

Prerequisite: Permission of instructor

Instructor: Rosalina V. Hairston, Ph.D.

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Office Hours: By appointment

### **Course Goal and Objectives:**

The course uses an historical approach to study the development of science curricula and the inclusion of science as a subject in elementary and secondary schools. The course will emphasize the history of science education in the United States from the colonial period to the present including the philosophy of ideas, and the political and economic state during these periods and their influence on science education.

At the end of the course, the students will be able to:

1. Formulate an operational definition of a curriculum.
2. Identify the components of a curriculum.
3. Trace the development of science curriculum in American public schools.
4. Describe the curriculum reform movement inspired by the launching of Sputnik.
5. Discuss the learning theories used in the curriculum projects from the 60s to the present.
6. Discuss the impact of the report, "A Nation at Risk "(1983) and the National Education Goals Report (2000) on the reforms in science education.
7. Describe the contemporary reforms in science and technology education that led to the development of standards in science education for grades K-12.
8. Analyze and evaluate selected standards-based curriculum materials in elementary science, middle school science, biology, chemistry, earth science, and physics.
9. Provide a framework to integrate the contemporary concerns in science education such as gender equity, multicultural science education, science teaching for diverse learners (exceptional and special education students), thematic approach curriculum, multidisciplinary curriculum, inclusion of ethical analysis in a curriculum, science-technology-society, state standardized testing, and the use of technology.
10. Analyze the impact of the No Child Left behind Act (NCLBA) to science education in public schools.

### **Course activities and requirements:**

1. Class participation on student-led seminar. Students will be assigned to lead the discussion on selected readings/topic
2. Group project on evaluation of science curricula and/or state frameworks
3. One term paper to be submitted in written form and presented in class

4. Two exams—a midterm and a final exam.

**Suggested Readings:**

- DeBoer, G.E. (1991). *A History of Ideas in Science Education: Implications for Practice*. New York: Teachers College Press.
- Goodlad, J.I. (1983). *A Place Called School: Prospects for the Future*. New York: McGraw-Hill.
- Duschl, R. A. (1990). *Restructuring Science Education: the importance of theories and their development*. New York: Teachers College Press.
- Clark, J.V. (1996). *Redirecting Science Education; Reform for a Culturally Diverse Classroom*. Thousand Oaks, California: Corwin Press, Inc.
- National Research Council. (1990). *Fulfilling the Promise: Biology Education in the Nation's Schools*. Washington, D.C.: National Academy Press.
- American Association for the Advancement of Science.(1989). *Project 2061: Science for all Americans*. Washington, D.C.: Author.
- U.S. Department of Education, Office of Educational Research and Improvement.(1997). *Attaining Excellence: Guidebook to Examine School Curricula*. Washington, D.C.: Author.
- Weiss, I. R., Banilower, E., McMahon, K.C., & Smith, S. P. (2001). *Report of the 2000 National Survey of Science and Mathematics Education*. Chapel Hill, North Carolina: Horizon Research, Inc.
- International Technology Education Association. (2000). *Standards for Technological Literacy*. Reston, Virginia: Author.
- American Association for the Advancement of Science. (1993) *Benchmarks for Science Literacy*. New York: Oxford University Press, Inc.
- National Research Council. (1996). *National Science Education Standards*. Washington D.C: National Academy Press.
- Selected articles and technical reports.

**ADA Statement:**

If a student has a disability that qualifies under the Americans with Disabilities Act and requires accommodations, he/she should contact the Office for Disability Accommodations for information on appropriate policies and procedures Box 8586; Tel (601) 266-5024; TTY (601)266-6837; Fax (601) 266-6035.

**Schedule of Activities:**

Week 1 January 6

- Orientation to the course
- Reading assignments and course requirements
- Excerpted from a special report: K-12 Science AND Mathematics Education Today is in Crisis
- Videotape: Before It's Too Late
- Lecture: Early conceptions of curriculum
  - Definitions of curriculum
  - The Curriculum-Instruction-Assessment Triad
  - Important principles about learning and knowing

Assignment:

1. Read the article on “Research on Goals for the Science Curriculum” by Bybee and DeBoer. Volunteer to lead discussion
2. Read the book, A Place Called School by Goodlad. Volunteer to lead discussion on chapters.

Week 2 January 13

Student-led discussion on, Research on Goals for the Science Curriculum

1. Basic Questions for the Science curriculum to Early American Influence on Science Curriculum (pages 357-364)
2. Nineteenth Century Science Education to Early 20<sup>th</sup> Century (pages 364-373)
- 3 Curriculum Reform of the Sixties to Conclusion (pages 373-385)

Lecture: Progressive Era and the Science Curriculum: RVHairston

Assignment:

1. Research on the so-called “alphabet-soup” science curricula of the 60s, such as BSCS, Chem Study, CBA, PSSC, Harvard Physics, ESCP. Research on evaluation of curriculum used in public schools by referring to the following journals, Journal of Research in Science Teaching and Science Education issue years from 1965 to 1980. Volunteers will be lead discussion.

Week 3 January 20 Martin Luther King Holiday

Week 4 January 27

Student-led discussion on chapters 1-5 of “A Place Called School”.

1. Chapter 1 Can we have effective schools?
2. Chapter 2 We want it all!
3. Chapter 3 Beyond Academics
3. Chapter 4 Inside Classrooms
4. Chapter 5 Access to Knowledge

Week 5 February 3

Student-led discussion on chapters 6-10 of “A Place Called School”

1. Teachers and the Circumstances of Teaching
2. What Schools and the Classrooms Teach
3. The Same but Different
4. Improving the Schools We Have
5. . Beyond the Schools We Have

Summarize the Talking Points of “A Place Called School”

Assignment:

1. Prepare to discuss the science curricula of the 60s.
2. Read “A Nation at Risk”. Volunteer to lead discussion.

3. Research the provisions of No Child Left behind Act (NCLBA) and how it will affect science and math teaching. Volunteers to lead discussion. Try <http://www.nsta.org>

Week 6 and 7 February 10 and 17

The 60s Science Curricula

BSCS (Biological Sciences Curriculum Study )

Chem Study or CHEMS (Chemical Education Material Study)

PSSC (Physical Science Study Committee)

ISCS (Intermediate Science Curriculum Study)

IPS (Introductory Physical Science)

Week 8 February 17

Student-led discussion on “A Nation at Risk”

Lecture: Education Goals 2000 by RVHairston

Finish reports on curriculum projects of the 60s

Lecture-discussion on Learning Theories used in the Curriculum

Projects of the 60s

RVHairston

Student-led discussion on “A Nation at Risk”

Week 9 February 24

Student-led discussion on

“What we have learned from the curriculum projects of the 60s” by R.E. Yager

“ What we have learned and where we are headed: Lessons from the Sputnik Era  
by G.DeBoer

Student-led discussion on “TIMSS Report on US Mathematics and Science  
Education”

Lecture-discussion: Education Goals 2000

RVHairston

Guidelines on Making Curriculum Decisions

RVHairston

Groupwork: Examination of State Frameworks Using the NSES and Benchmarks

Midterm Exam

Week 10 March 3

Historical Perspectives on the NSES and Benchmarks

RVHairston

Report and discussion on State Frameworks

Student led discussion on Report of the 2000 National Survey of Science and  
Mathematics Teaching

Elementary Science

Elementary Mathematics

Middle School Mathematics

Middle School Science

Secondary School Mathematics

Week 11 March 10-17 Spring Holidays

Week 12 March 17

Continue discussion on 2000 National Survey of Mathematics and Science Teaching  
Secondary Earth Science  
High School Biology  
High School Chemistry  
High School Physics

Week 13 March 24

Standards-Based Curriculum Materials from the Dissemination Centers  
Using the EDC Guideline on Curriculum Decision  
Critique of Selected Curriculum Materials (to be selected by students)

Week 14 March 31

Speaker: Dr. Tom Williams  
Topic: Operating the dissemination hub of the Standards-Based Science Curriculum Materials

Finish discussion on Curriculum projects

Week 15 April 4 Friday Meet at 4:00 p.m. with Dr. Lillian McDermott physics professor who is doing research on physics teaching. Title of talk "Bridging Teaching and Learning"

Week 15 April 7 No class meeting replaced by April 4 Discussion with Sigma Xi guest speaker

Week 16 and 17 April 14 and 21

Presentation of Term Papers

Week 18 April 28

Student-led discussion: No Child Left Behind Act  
Student-led discussion on "Modernizing Science Education" by Paul DeHart Hurd  
Simulation: Implementation Game  
Synthesis of the course

Week 19 May 5

Final Exam

END