The Graduate School at the College of Charleston  
EDFS 660, Nature of Science, Mathematics and Science/Mathematics Education  
Spring, 2017  
3 Credit Hours—45 contact hours  
ECTR 218  
Monday 5:30-8:45 pm

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<tr>
<th>Instructors ’ Name:</th>
<th>Meta Van Sickle</th>
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<tr>
<td>Office Hours:</td>
<td>M &amp;W 1:00- 3:30 pm</td>
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<tr>
<td>Office Location:</td>
<td>#321 86 Wentworth St.</td>
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| Office phone/Fax/ Email: | 843.953.6357  
843.953.5407 (fax)  
vansicklem@cofc.edu |
| Course Prerequisites: | None |
| Course Description: | Topics include the historical development of science and mathematics and the variety of philosophies in science/mathematics education. Other topics include social trends affecting science education in the United States since 1893, including reform movements of 1985, 1904, 1937, 1945, 1960 and the present; and local frameworks addressing national and global concerns. |
The course will employ a variety of methods intended to give teachers a broad array of pedagogical tools for use in their classrooms (including dialogic process, constructivist practices, inquiry and other current best practices).

At the end of this syllabus is a copy of the School of Education’s mission statement, teaching/learning standards, and grading policies. This course is designed to focus on the teaching/learning standards.

Information from this course is for in class and NCATE use only and will not be given out for any commercial solicitation.

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<th>Course Text/Materials:</th>
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<tr>
<td>Science For Americans, Benchmarks. 1992. Will be available in Library Reserves and online.</td>
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<tr>
<td><a href="http://www.nextgenscience.org/next-generation-science-standards">http://www.nextgenscience.org/next-generation-science-standards</a></td>
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<tr>
<td>NCR Science Standards. Online, free.</td>
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Course Objectives:
1. To study the natures of science and mathematics so that each teacher can explore and describe the epistemology of science and mathematics and science and mathematics education.
   A. To experience science and mathematics through experiences that help define the natures of science and mathematics,
   B. To read a variety of authors on the topics of the nature of sci/math and sci/math education, and,
   C. To describe a personal, data-based, description of the natures of science and mathematics.

2. To study the complexity of teaching and teaching practices that are consistent with the natures of science and mathematics.
   A. To read and understand national and state frameworks for science and mathematics education,
   B. To experience teaching pedagogy compatible with the natures of science and mathematics, and
   C. To match the science and mathematics pedagogues to the tenets about the natures of science and mathematics selected by the individual from the literature.

**Course Requirements: Description of Projects/Assignments:**

List all course requirements and give a description of each, and specific descriptions of all assignments. As a class we will chose 4 of the options from 1-6 or create an assignment to replace one of the 1-6 choices. Number 7 is mandatory.

2. Activity—Write three activities that teach about the nature of sci/math for use in your classroom. Explain the components of the
nature of sci/math that you are teaching. You must use the 5e’s lesson plan format.

+3. Research and reflect—Teach the activity that you wrote. Collect data that illustrates what your students learned about the nature of sci/math. Write a short teacher action research paper that describes your findings.

*4. Concept map—Complete a concept map (Novak model) that shows your beliefs about the natures of science/mathematics/teaching. The relationships and cross links are the most important features of the map.

+5. Video tap and analysis—Watch a taped lesson that uses the 5e’s lesson plan, use all the criteria discussed during the semester and evaluate the effectiveness of the teaching in a manner consistent with your beliefs about the nature of science/mathematics.

6. App and website review. Use the form and complete a review of 5 apps and/or websites to help you teach about science practices.

Class Attendance and Participation
Each student is to attend class regularly and on time. It is imperative that you participate in large and small group discussion and activities. Because the method(s) of teaching that you will be learning are significantly different from methods that you have learned in other courses your participation is mandatory. I record your attendance and participation after each session. You can lose up to two letter grades by failing to attend and participate. (SOEStd I, II, III, IV, V, VI)

- choose one from assignments 1 or 4
- choose one from assignments 3 or 5
Evaluation Scale:

The School of Education grading policy will be followed. See attachment

Evaluation Criteria:

(Include all activities that have a direct impact on the final grade)

Four assignments (20 points each)  80%
Class Attendance and Participation  20%

Resource Reading List:

Benchmarks
NSE/NRC Standards
NCTM Common Core Standards
SC Frameworks

Attendance Policies:

Absences are not encouraged. If you must miss make sure to gain the instructors approval. We follow the College of Charleston policy manual.

Honor System:

We will follow the College of Charleston policy manual.
**Performance Data:**

All course requirements are performance based.

**Course Calendar:** (list the date and specific topic and assignments for each course meeting)

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignment/Readings</th>
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| Week 1 | What is epistemology?  
 Cube activity                                                   | Handouts distributed                              |
| Week 2 | What did your author say about the nature of math,  
 science and technology?                                       | Select book  
 Use the handouts.                                |
| Week 3 | What does SFAA/Benchmarks say about the natures of science,  
 mathematics & technology?                                     | SFAA/Benchmarks 1-3  
 NRC/NCTM  
 Inquiry/Science/Math Practices                        |
| Week 4 | What components of the algebra tile activity match your authors’  
 thoughts about the natures of m,s &t?                         | Con’t                                              |
| Week 5 | What do math and science education philosophers say about the  
 nature of m,s&t?                                               | Use a lit. search to find an article on the nature of math,  
 science education philosophy.                        |
<p>| Week 6 | What components of the attribute hoops                           | Discuss article, and activity                     |</p>
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<th>Week 7</th>
<th>What is pedagogy?</th>
<th>Bring your definition to class with you.</th>
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<td>Week 8</td>
<td>What components of the FOSS kit activities match your authors’ thoughts about the natures of m,s &amp; t?</td>
<td>Discuss pedagogy of the activity and compare to the natures of m,s &amp; t the class has developed.</td>
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<td>Week 9</td>
<td>How do I write a lesson plan to match the nature of math and science?</td>
<td>Review learning cycle lesson plan formats.</td>
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<td>Week 10</td>
<td>What components of the technology activities match your authors’ thoughts about the natures of m,s &amp; t?</td>
<td>Review learning cycle lesson plan formats.</td>
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<td>Week 11</td>
<td>Timeline and comparison of books to articles</td>
<td>Discuss articles and books.</td>
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<td>Week 12</td>
<td>History</td>
<td>Discuss the historical influences on the nature of s, m &amp; t.</td>
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<tr>
<td>Week 13</td>
<td>How do I get my students to understand the natures of m, s &amp; t?</td>
<td>Discuss the praxis point of taking the course information into the classroom.</td>
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<tr>
<td>Week 14 &amp; 15</td>
<td>Teach</td>
<td>Groups teach lessons.</td>
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