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Class Time: 4.00-6.30 pm (or 4.30-7.00) or (4.55-7.35)
Meeting Room: Silver 412
Office Hours: Tuesday 3-5pm or by appointment

Course Outline
This year-long course integrates a study of secondary science curriculum and science teaching methods. Framing our approach is the use of science content storylines (Roth, 2009) as an integral element of all curriculum planning and evaluation at the lesson, unit and course levels. Important aspects of curriculum theory and design for secondary science are introduced through four case studies of policies and theories driving curriculum development (e.g. Common Core State Standards, Man: A Course of Study), assessment, curriculum, and learning progressions and the small school movement (e.g. PBATS, School of One), culturally responsive curriculum (e.g. Ladson-Bilings), international assessment and accountability (e.g. Trends in Math and Science Study (TIMSS) and Program for International Student Assessment (PISA) and the Danielson model of teacher evaluation). These case studies will also provide the context for examination of science methods such as lesson and unit planning, classroom management and multimedia/technology integration.

Course Objectives
Whatever you do in this course and in your practice in the classroom our entire focus for this course should also be your focus for your teaching practice and curriculum development always remember that your teaching practice is about supporting students to learn SCIENCE. Try to always think what that might entail in any courses you develop. Also, in this course you will be asked to self-assessment, self-evaluate, and self-grade your learning from the course. What this entails for you will be the focus of some discussions

Students will be able to:
1. Analyze the role of standards and benchmarks in the development of curriculum and standardized testing at the State and National level and accountability testing at the international level and explore models of relationship between assessment and learning.
2. Through an historical examination of science curriculum evaluate the role of values in curriculum theorizing and intended curricula critique these theoretical perspectives.
3. Review issues of curriculum and assessment and the concept of learning progressions through an analysis of observed practice and the development of a topic-based scope and sequence for a science unit.

4. Using “backwards design”, project-based inquiry, or design study create overarching questions that serve to frame your scope and sequence and specific questions that you match with standards and activities in planning lessons and examine the strengths and limitations of such a method in order to develop a detailed unit of study that resides within the scope and sequence you develop.

5. Explore and integrate the concepts of culturally relevant pedagogy and differentiated instruction and their application to curriculum development through implementation in lesson planning and practice.

6. Examine the nature of assessment and analyze assessment tasks to identify how assessment can inform curriculum development and within a scope and sequence demonstrate the role and use of formative and summative assessment strategies in pedagogy.

In the beginning. . . .

Reading Resources:


Schwab, J. J. Second reading posted to Blackboard

Week 2


Initial Enabling Case Studies

1. How can you provide convincing evidence that your actions as a teacher have made a difference to students learning? Are your students learning the knowledges valued by the discipline or by society? In the time of value-added models for evaluating teaching involving the use of observation rubrics such as that developed by Charlotte Danielson (DRISTOS), what can National and International Competitions tell us about Assessment and Accountability, the Development of Standards and Benchmarks and Common Core State Standards?

In contemporary society there have been a number of developments in science curriculum that most likely will influence your classroom practice in one way or another. These developments are connected with the other cases you have examined in this course because each of these cases is based on someone's belief that there is a better way to develop curriculum and enact that curriculum through teaching practice and education and the allocation of resources. But how can you know which of these curriculum approaches provides the best learning? Where is our evidence? What is the nature of the evidence we can provide?

In 1964 with a grant from the Carnegie Corporation the National Assessment of Educational Progress was established in the US. Periodically, assessments are conducted in mathematics, reading, science, writing, the arts, civics, economics, geography, and U.S. history and they continue to this day. In 1995 the first
TIMSS (Trends in Math and Science Study) was conducted. It uses very similar items to the NAEP. In 2000 PISA was launched. It tests 15 year olds to see if they are ready to apply knowledge they have learned in schools to other situations. In 2009, NAEP introduced Hands-On and Computer 1.

Where does assessment fit in your curriculum? What forms of assessment do society, schools, teachers, and students value? Is science all about conceptual understanding and skill development? What models of assessment do you have? What is the role of standards and benchmarks in the curricula you develop for the students and courses you teach? (2 weeks)

How can we use assessment to interrogate student understanding and how do you construct evidence of the relationship between your goals for student learning and the assessment tasks you develop? How are standards aligned with learning progressions? (2 weeks)

How have results of NAEP, TIMSS, and PISA affected science curricula in the US? (1 week)

What philosophical understandings inform our curriculum and assessment strategies? (1 week)

Reading Resources:


3. What was the impetus for the Nation's Report Card?


2. Contemporary echoes of a time when being in space even affected science curriculum!! The curious case of Man: A Course of Study (MACOS)

Man: A Course of Study was the last curriculum developed by the National Science Foundation in what has been called the Golden Era of science education. The era that followed the US interest in developing scientifically appropriate curricula. Such development shadows various theoretical positions with names like essentialism, progressivism, and disciplinariness, which held sway at various times in science education history beginning in the 19th century with the promotion of nature study as an important element of a school's curriculum. But how can we understand the concept of a curriculum? What factors influence the development of curriculum? An examination of the development of the curriculum program and associated materials for Man: A Course of Study will help us to explore these questions and others outlined below.

Structure and Nature of Curriculum (Who decides?)/Agency (Yours)

2.1 How have values influenced the development of curricula? (2 weeks)

2.2 How has curriculum been defined and practiced and what does that tell us about science curriculum structure? What is the role of scientific literacy? What is the relationship between the
nature of science and scientific literacy? What are the understandings that we should value and what evidence do you have that you do? (2 weeks)

2.4 As a curriculum developer how do you decide what to include and what to leave out and how do you decide when certain content and skills should be emphasized? What is the emphasis of the State core curriculum? What story does that core curriculum tell? (1 week)

2.5 Develop curriculum plan for a year-long course for a specific science discipline. (1 week)

Reading Resources


3. Is assessment for learning the same as individualized instruction? The challenging case of Learning Progressions and the School of One

In 2009 School of One began a pilot summer program in New York City Chinatown. It claims to use learning progressions of disciplines like mathematics and science to address the identified learning needs of students. Its mission is to provide students with personalized, effective, and dynamic classroom instruction customized to each student's academic needs, interests, and learning preferences. How does this approach work and does it work are the two questions that will be the focus of this case study.

Resources, Norms/Values, and Agency (Yours and the Students)

3.1 What are learning progressions? (1 week)
3.2 How are they used in the School of One? (1 week)
3.3 How do we make use of the knowledge and experiences students bring to the curriculum? How do schools construct different types of students? (1 week)
3.4 What is the role of enabling/overarching/driving questions in curriculum development? What enabling questions can you use to frame your intended curriculum? How would you frame a unit plan around one of the enabling questions that you have identified? (1 week)
3.5 What is the relationship between curriculum, learning and assessment? How is assessment for learning a useful construct for learning progressions based curricula? (1 week)
3.6 Even when resources are available teachers and students might not use them. How can this be? (1 week)

Reading Resources


4. How does knowing your students better allow you to develop curriculum that better support your students learning? The emotive case of Culturally Responsive Curricula and the Small Schools Movement

Gay (2000) defines culturally responsive teaching as using the cultural knowledge, prior experiences, and performance styles of diverse students to make learning more appropriate and effective for them; it teaches to and through the strengths of these students. In New York City there has been a movement to break up large schools into smaller schools. Why would this be considered a "good" thing?

4.1 What is the small schools movement and how is it associated with culturally relevant teaching? How do you implement culturally relevant pedagogy in your practice? What forms of understanding do you value in student learning? (2 weeks)

4.2 Other models of curriculum design, such as design-based curriculum and project-based inquiry science, are also often associated with small schools. What are these forms of curriculum design? Do they have features in common or are they very different? Develop a lessons/series of lessons that is informed by one of these pedagogical approaches. How can these approached be linked to learning progressions? (3 weeks)

4.3 What are some of the challenges associated with small schools and how well do small schools address these challenges? (1 week)

Reading Resources


**Additional Reading Resources**


OECD. (2009). *PISA Take the test: Sample questions from the OECD’s PISA assessments.* OECD. [http://www.youtube.com/watch?v=Ugz_1Clpsdk](http://www.youtube.com/watch?v=Ugz_1Clpsdk)


**Required Textbook:**
Core Curriculum for discipline major and other standards and a textbook from your major teaching area.

Some readings are listed and others will emerge as the course evolves.

**Assessment Tasks (Year):**

1. Complete a values analysis and tasks associated with demonstrating an understanding of various theories of curriculum and complete an analysis of how these theories are integrated into your practice or the practice of other science teachers you observe.

2. Develop a scope and sequence for a course of study you are teaching or hope to teach.

3. Review issues of curriculum, assessment, and the concept of learning progressions through an analysis of a unit you teach.

4. Using “backwards design”, project-based inquiry, or design study, create overarching questions that serve to frame your scope and sequence, specific questions that you match with standards and activities in planning lessons, and examine the strengths and limitations of such a method.

5. Demonstrate your understanding of the concepts of culturally relevant pedagogy and differentiated instruction and their application to curriculum development through implementation in a series of lesson plans and in your classroom practice.

6. Develop an urban science inquiry-based unit plan that is an integral element of the scope and sequence you developed and which incorporates the principles of enabling questions, learning progressions, and backwards design.

7. Develop a 15-minute science activity that you videotape which is both peer-reviewed consistent with the principle of “critical colleagueship” (Lord, 1995) and individually analyzed using the research lenses that are featured in this course as theoretical frames supporting your analysis.

8. Analyze assessment tasks to identify how assessment can inform curriculum development and within a scope and sequence demonstrate the role and use of formative and summative assessment strategies.

9. Analyze the role of standards and benchmarks in the development of curriculum and standardized testing at the State and National level and accountability testing at the international level.

10. Maintain weekly reflections on your learning and how you integrate such learning in your practice.

**Grades**

Attendance and timeliness should be taken into account when developing a grade but the major focus of this course is to assist you to develop a scholarly capacity to critically analyze curriculum concepts and use your knowledge to inform your own curriculum planning and communication. Because you need to be able to articulate evidence of learning you will be required to use self and peer assessment in the course.

**Evaluation Rubric**

In this course, we are looking for scholars who creatively engage with the material, can provide evidence from the materials they have produced during the course of their learning and begin to develop a personal philosophy of teaching.

*A = Evidence of learning, thoughtful analysis, capacity to integrate theory and practice and be creative*

All major assessment tasks are completed in a way that demonstrates your skill as a connected learner able to understand the arguments and practices of others and to evaluate these claims and to use what you learn in your practice. You also need to be a composer of arguments able to use evidence (in the form of excerpts from your online reflections and from materials you create) and theory, provide evidence of your learning. You participate in all classes and provide evidence during class that you have read and thought about the ideas in the readings prior to coming to class. You demonstrate the ability to use evidence to support your claims for learning.

*B*

All major assignments completed to a good standard but you may not make such strong connections. Also, you may not demonstrate the same creativity and capacity to make connections as that expected of an A level

*C = Inadequate for Masters level*

Tasks are completed in a perfunctory way and there is less evidence of connections made between practice and theory in your practice. Often claims are not well supported by evidence.

*F = Fail*

Required tasks not completed.

**Accommodation for NYU Students with Disabilities**

Any student attending NYU who needs an accommodation due to a chronic, psychological, visual, mobility, and/or learning disability, or is Deaf or Hard of Hearing should register with the Moses Center for Students with Disabilities at 212 998-4980, 726 Broadway, 2nd Floor. See [www.nyu.edu/csd](http://www.nyu.edu/csd).

**Academic Honesty, Dishonesty, and Plagiarism**

The following is adapted from the NYU Steinhardt *Student’s Guide* (p. 24) and from the Policies and Procedures of the NYU Expository Writing Program (available from [http://www.nyu.edu/cas/ewp/html/policies__procedures.html](http://www.nyu.edu/cas/ewp/html/policies__procedures.html)):

The relationship between students and faculty is the keystone of the educational experience in The Steinhardt School of Culture, Education, and Human Development at New York University. This
relationship takes an honor code for granted. Mutual trust, respect and responsibility are foundational requirements. Thus, how you learn is as important as what you learn. A university education aims not only to produce high quality scholars, but to also cultivate honorable citizens.

*Academic integrity* is the guiding principle for all that you do; from taking exams, making oral presentations to writing term papers. It requires that you recognize and acknowledge information derived from others, and take credit only for ideas and work that are yours.

You violate the principle of academic integrity when you:

- Cheat on an exam;
- Submit the same work for two or more different courses without prior permission from your professors;
- Receive help on a take-home examination that calls for independent work;
- Plagiarize.

*Plagiarism*, one of the gravest forms of academic dishonesty in university life, whether intended or not, is academic fraud. In a community of scholars, whose members are teaching, learning and discovering knowledge, plagiarism cannot be tolerated. Plagiarism is failure to properly assign authorship to a paper, a document, an oral presentation, a musical score and/or other materials, which are not your original work.

You plagiarize when, without proper attribution, you do any of the following:

- Copy verbatim from a book, an article or other media
- Download documents from the Internet
- Purchase documents
- Report from other's oral work
- Paraphrase or restate someone else's facts, analysis and/or conclusions
- Copy directly from a classmate or allow a classmate to copy from you

For more on academic integrity see [http://steinhardt.nyu.edu/policies/academic_integrity](http://steinhardt.nyu.edu/policies/academic_integrity).

### Schedule Semester 1

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<tr>
<th>Dates</th>
<th>Focus</th>
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<td>Date</td>
<td>Topic</td>
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<tr>
<td>September 24</td>
<td>What can National and International Competitions tell us about Assessment and Accountability, the Development of Standards and Benchmarks and Common Core State Standards? &lt;br&gt;What values are held dear? Values analysis &lt;br&gt;What are PISA, TIMSS, and NAEP?</td>
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<td>October 1</td>
<td>What are Common Core Standards? How are they important to science teachers?</td>
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<td>October 15</td>
<td>No class (Deadline for Mid-term Grades - October 19)</td>
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<td>Date</td>
<td>Case Study 2 (Cont.)</td>
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<tr>
<td>November 5</td>
<td><strong>Case Study 3</strong> - Is <em>assessment for learning</em> the same as individualized instruction? The challenging case of Learning Progressions and the School of One</td>
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<td>November 5</td>
<td>What does the Coalition for Effective Schools have to say?</td>
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<td>November 26</td>
<td><strong>Case Study 4</strong> - How does knowing your students better allow you to develop curriculum that better support your students learning? The emotive case of Culturally Responsive Curricula and the Small Schools Movement</td>
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<tr>
<td>November 26</td>
<td>What is the small schools movement and how is it associated with culturally relevant teaching? What forms of understanding do you value in student learning?</td>
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<td>December 3</td>
<td>How do you implement culturally relevant pedagogy in your practice?</td>
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<td>December 10</td>
<td>Is smaller better?</td>
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<td>December 12</td>
<td>Extra Class</td>
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<td>December 17</td>
<td>Exam and submission of self-evaluation for Semester 1.</td>
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**28 January (This semester we follow the Danielson model themes including Planning and Preparation, Classroom Environment, Instruction, and Professional Responsibilities)**  
Why would we do that?

**Course Introduction – second semester.** Focus on teaching methods this semester and unit planning and implementation. Readings are from Gregory or are posted in this Schedule.  
*Lawrence Summers and his themes:* 1) Education will be more about how to process and use information and less about imparting knowledge as information; 2) Tasks will require more collaboration because no one can know everything [in research there are other implications of this issue]; 3) New technologies will profoundly influence how new knowledge is communicated; 4) Learning is active, embodied, exploratory; 5) Education is global [it is also historical and cultural]; 6) What does it mean to say that we are engaged in evidenced-based practice?  
How do you understand these ideas?  
Describe and Explain  
Visualizing  
Inductive and Deductive Reasoning  
**Reading for next week:** Gregory Chapter 3

**4 February**  
The Pedagogical Process. Is good teaching also good management?  
How do the goals of instruction relate to the goals of classroom management?  
How does the structure of a school program affect the instruction in classrooms?  
DRSTOS examination with edTPA  
What is a lesson plan?  
Readings:  
Mary Bud Rowe (1986). Wait time: Slowing down may be a way of speeding up. & wait time, *Journal of Teacher Education*, 37, 43-50.  

**11 February**  
**Theme: Planning and Preparation**  
Making Connections with Students –  
Are there big ideas in science that we are always teaching, within a course, within a science program, within a school?  
How can science topics be related to each other and to other disciplines? How do you know your lesson is coherent?  
**How do science content storylines help us to think about this question?**  
Lesson Plans – what are they? What should they contain? How do SCSL help us develop lesson plans?  
5 Es  

**18 February**  
Presidents’ Day – holiday (Mid-winter recess NYC DOE)
<table>
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<tr>
<th>Date</th>
<th>Theme</th>
<th>Activity</th>
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<tr>
<td>25 February</td>
<td><strong>Curriculum Models – Backwards Design</strong>&lt;br&gt;Is it the only game in town?&lt;br&gt;Unit Plan overview and set up.</td>
<td>Reading: Jan L. Plass, Catherine Milne, Bruce D. Homer, Ruth N. Schwartz, Elizabeth O. Hayward, Trace Jordan, Jay Verkuilen, Florrice Ng, Yan Wang and Juan Barrientos Article first published online: 19 JAN 2012</td>
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<td>4 March</td>
<td><strong>How can we use technology to improve classroom interactions and student learning?</strong>&lt;br&gt;How do we decide how we use technology and what technology to use?  (Richard Thornlie?)&lt;br&gt;- Content (e.g. PBS videos &amp; M&amp;M simulations)&lt;br&gt;- Pedagogy&lt;br&gt;- Management&lt;br&gt;Readings: Dweck, C. (2008) Brainology School Matters&lt;br&gt;Wiggins, G. (1989). The futility of trying to teach everything of importance. <em>Educational Leadership</em></td>
<td>Teacher Volunteers:</td>
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<td>18 March</td>
<td><strong>Spring Break</strong></td>
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<tr>
<td>25 March</td>
<td><strong>How do classroom interactions support or inhibit students’ acquisition of learning skills and content?</strong>&lt;br&gt;Reading: Milne, C. (2008). In praise of questions: Elevating the role of questions for inquiry in secondary school science. In J. Luft, R. L. Bell, &amp; J. Guess-Newsome (Eds.), <em>Science as inquiry in the secondary setting</em> (pp. 99-106. Washington, DC: National Science Teachers’ Association</td>
<td>Teacher Volunteers:</td>
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<tr>
<td>1 April</td>
<td><strong>What's in a question?</strong>&lt;br&gt;Activity: For question generation</td>
<td>Reading: Sheppard, L. (2000). The role of assessment in a learning culture. <em>Educational Researcher, 29</em>(7), 4-14</td>
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<td>8 April</td>
<td><strong>How can we create opportunities for all students to connect new knowledge to prior knowledge, and use their knowledge creatively?</strong>&lt;br&gt;How can I make sure that the assessment tasks I set are consistent with my learning goals and how do I support students to share these goals and these assessments? <strong>Shppard questions</strong>&lt;br&gt;Reading: [<a href="http://www.all4ed.org/publication_material/reports/meaningfulmeasurement">http://www.all4ed.org/publication_material/reports/meaningfulmeasurement</a> chapter 3](<a href="http://www.all4ed.org/publication_material/reports/meaningfulmeasurement">http://www.all4ed.org/publication_material/reports/meaningfulmeasurement</a> chapter 3)</td>
<td>Teacher Volunteers:</td>
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<td>15 April</td>
<td><strong>What should I think about when setting up assessment tasks?</strong>&lt;br&gt;What's in a rubric? How can I structure tests to improve student learning? How can I identify the assessments that take place in a lesson, a unit, and a course?</td>
<td>Teacher Volunteers:</td>
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<td>Date</td>
<td>Theme</td>
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| 22 April | Instruction – Using assessment            | How can I ensure that my system of assessment is effective for all students?  
Reading: Reading: Lord, B. (1995). Teachers’ professional development: critical colleagueship and the role of professional communities |
| 29 April | Instruction – Using assessment            | What does it mean to be a professional?                                  
Beyond Communicating with Families and Keeping Accurate Records (They’re givens)  
Teacher Volunteers: Zain (Fatima) |
| 6 May   | Professional Responsibilities             | Teacher Volunteers:                                                     |
| 13 May  |                                           | Teacher Volunteers:                                                     |
| 18 May  |                                           | Exam Day – May meet to explore aspects of the course.                    |