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| http://www.ric.edu/webcommunications/images/SealWithText_Small_Black.png | **Rhode Island College**Feinstein School of Education and Human DevelopmentSED 548: Science Methods in Secondary Schools |

##### Course Information

This course will focus on the implications and applications of the Next Generation Science Standards.

Instructor Dr. Rudolf Kraus

Teaching Assistant Lesley J. Shapiro

Office: Henry Barnard School, Rm. 206-6

E-mail: [rkraus@ric.edu](mailto:rkraus@ric.edu)

Office Phone: 401-456-8996

Office Hours: after class, or by appointment

Class schedule: Thursdays, 4-6:50

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| Learning Objective | How is it assessed? |
| 1. SWBAT describe the reasons for a new set of science standards | Reflection I & II |
| 2. SWBAT evaluate the pros and cons of changing standards | Reflection III |
| 3. SWBAT describe at least five characteristics of the science instruction suggested by the NGSS | In-class discussion, NGSS Aligned Lesson |
| 4. SWBAT analyze a curriculum for alignment to the NGSS | Alignment chart |
| 5. SWBAT revise a scope and sequence to be compatible with the NGSS | Revised scope and sequence |

##### Course Texts and materials

There is a required textbook, the Next Generation Science Standards, (ISBN 978-0-309-27227-8) available at a discount to members through the NSTA Science Store, <http://www.nsta.org/store/product_detail.aspx?id=10.2505/9780309272278>

It is also available as an electronic resource online, or through the app store. All other readings will be provided.

##### Course Overview

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| Day/week | Class topic | Readings | Assignments |
| Week 1-3 | Why change at all? | Teaching Gap, Hodson | Reflection I |
| Week 4-5 | How do we manage change? | Bupp’s change curve, Backus | Reflection II |
| Week 6-8 | Change to what? | NGSS and Framework | Reflection III and IV |
| Week 9-14 | How does this look in my classroom? | Current curriculum and NGSS | Scope and Sequence |

##### Requirements

SED 548 is a graduate education class, it should be treated as a professional obligation. As a result, absences are not acceptable unless an emergency arises. Should such a situation occur, please contact me by email or phone as soon as possible. On your 2nd unexcused absence, 5 percentage points will be deducted from your final average – on your 3rd unexcused absence, an additional 5 percentage points will be deducted from your final average– being in class means being present for the entire time. Your peers depend on you in several ways in this class.

* Academic Dishonesty Policy (Rhode Island College Handbook of Policies, Practices, and Regulations (Spring 2010), Chapter 3: Academic policies and procedures. Pp. 32-34, section 3.9.1.): <http://www.ric.edu/administration/pdf/College_handbook_Chapter_3.pdf#28>
* Request for Reasonable Accommodations for Students with Disabilities: <http://www.ric.edu/disabilityservices/faq.php>
* The instructor reserves the right to change the syllabus at any point in the semester to accommodate learners’ needs and pace of progress. Students will be notified in class of any changes.
* Students’ assignments may be duplicated and utilized anonymously for the Department’s program folios, for purposes of accreditation. All information that identifies a document as belonging to a particular student will be removed before it is used.

##### Grading

Reaction Paper I 10%

Reaction Paper II 10%

Reaction Paper III 10%

NGSS compatible lesson 20%

Final scope and sequence 40%

Participation 10%

100%

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| Final Grade | Percentage | Final Grade | Percentage | Final Grade | Percentage |
| A | ≥ 93.3% | B- | ≥ 80.0% | D | ≥ 66.6% |
| A- | ≥ 90.0% | C+ | ≥ 76.6% | D- | ≥ 60.0% |
| B+ | ≥ 86.6% | C | ≥ 73.3% | F | ≤ 59.9% |
| B | ≥ 83.3% | C- | ≥ 70.0% |  |  |

##### Course Assignments

Reaction Paper I

Write a two page essay that answers the question: What are the challenges and opportunities presented by the Next Generation Science Standards? Please include 2+ citations, in APA format, to particular areas of the text you are referring to, so that the reader knows what you are looking at.

Reaction Paper II

Write a two page essay that answers the questions: Why change? What will be gained and lost from the transition to the new standards? Will it be worth it? Include a discussion of the different levels of education, including national, state, and local. Please include 2+ citations, in APA format, to particular areas of the text you are referring to, so that the reader knows what you are looking at.

Reaction Paper III

Write a two page essay that answers the question: How will the NGSS change my classroom practice. Please include 2+ citations, in APA format, to particular areas of the text you are referring to, so that the reader knows what you are looking at.

NGSS Aligned Lesson

Write a lesson plan that demonstrates the three dimensional nature of the NGSS.

Scope and Sequence

Design a scope and sequence that contains the following: approximately 180 days of instructional time, one thirs of the DCIs for either middle or high school, defined units of study, learning objectives, integration of XCCs and PSEs, and CCSS connections.

##### Course Schedule

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| Week | Class topic | Homework Assignments (to be completed before the next class) |
| 1 | Introduction / Schiro Survey / NGSS Intro Video | * Complete Reaction Paper I * Read Introduction to Curriculum Ideologies by Schiro |
| 2 | Reaction Paper I DUE  The Teaching Gap | * Read A Year Without Procedures by Lisa Backus * Read Developing Students’ Ability to Ask More and Better Questions Resulting from Inquiry-Type Chemistry Laboratories by Avi Hofstein |
| 3 | History of Reform in Science Education | * Complete Reaction Paper 2 * Read The Death Valley of Change by Elrod and Tippett |
| 4 | Reaction Paper II DUE  Change Curves | * In the Framework for K-12 Science Education read chapter 3, Dimension 1: Scientific and Engineering Practices, and read chapter 4, Dimension 2: Cross Cutting Concepts |
| 5 | Decoding the NGSS / Map Discipline and Compare | * In the Framework for K-12 Science Education read the Dimension 3 chapter appropriate to your particular discipline and read the Dimension 3 entitled Disciplinary Core Ideas—Engineering, Technology, and Applications of Science |
| 6 | PSE, XCC, NOS  Watch & Discuss Teaching Channel videos | * Read Where Are We Now and What Have We Learned by Stephen Pruitt * Design a lesson plan for an NGSS lesson that is aligned to the three dimensions of the NGSS |
| 7 | NGSS Aligned Lesson Plan DUE  AMNH Tool 1 | * Complete AMNH Tool 3 Readings |
| 8 | AMNH Tool 3 (5E Model) | * Complete Reaction Paper III |
| 9 | Reaction Paper III DUE  Four Circles Activity | * Read Appendix K |
| 10 | Appendix K and Timelines | * Finish Timeline * Read Mager Chapter |
| 11 | Learning Objectives | * Complete the rough draft of your scope and sequence project |
| 12 | Peer Review | * Work on Scope and Sequence * Read assigned classroom sample task |
| 13 | Assessment and the NGSS | * Finish Scope and Sequence |
| 14 | Scope and Sequence Projects DUE  Presentation Day – Course Evaluations |  |

##### References

Backus, L. (2005). A year without procedures: removing procedures from chemistry labs creates opportunities for student inquiry. *The Science Teacher*, *72*(7), 54-58.

Elrod, P. D., & Tippett, D. D. (2002). The “death valley” of change. *Journal of Organizational Change Management*, *15*(3), 273-291.

Hofstein, A., Navon, O., Kipnis, M., & Mamlok‐Naaman, R. (2005). Developing students' ability to ask more and better questions resulting from inquiry‐type chemistry laboratories. *Journal of research in science teaching*, *42*(7), 791-806.

Mager, R. F. (1975). *Preparing Instructional Objectives*, Fearon, California.

National Research Council (2012) *A framework for K-12 science education: practices, crosscutting concepts, and core ideas.* The National Academies Press, Washington

NGSS Lead States. (2013). *Next generation science standards: For states, by states*. National Academies Press.

Pruitt, S. L. (2015). The next generation science standards: Where are we now and what have we learned?. *Science & Children*, *52*(9), 7-9.

Schiro, M. (2012). *Curriculum theory: Conflicting visions and enduring concerns*. Sage.