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EDCI 5250

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EDCI 5250
Methods and Materials in Secondary Science Teaching
Spring 2016

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Textbooks:

1. Bass, JE, Contant, T and Carin AA (2009) Activities for Teaching Science as Inquiry, 10 ed. New York: Allyn and Bacon. ISBN 978-0-13-235329-8
2. Bass, JE, Contant, T and Carin AA (2009) Activities for Teaching Science as Inquiry, 7ed. New York: Allyn and Bacon. ISBN 978-0-13-615680-2

A useful reference:

Buxton and Provenzo (2011) Teaching Science in Elementary and Middle School. Los Angeles: Sage Publications. ISBN: 978-1-4129-7991-7 (pbk)

Other materials to be assigned.

Online Resource: www.sagepub.com/buxtonstudy

Unit Standards: <http://coehd.uno.edu/cf.cfm>

State Standards: <http://www.doe.state.la.us/lde/pd/1009.html>

National Standards: www.nap.edu/openbook.php?record_id=4962

NSTA Standards: <http://www.nsta.org/pdfs/NSTASTandards2003.pdf> Other materials to be assigned

Course Description:

A major portion of this course is concerned with producing a portfolio displaying work satisfying the National Science Teacher Association standards for teaching secondary science.

In this course we will work together to understand the methods and materials appropriate for the teaching of secondary school science in the state of Louisiana (6-12). Throughout the course you will be encouraged to reflect on your learning as a tool for thinking about how learning happens.

The philosophy of this course is that people of all ages and learning styles learn best in an environment where they explore topics and come to their own understanding. This environment includes working cooperatively with others from diverse backgrounds in heterogeneous settings and is consistent with the College of Education and Human Development's mission to prepare professionals who practice in culturally diverse settings.

Goals:

- Demonstrate strategies for teaching and enhancing acquisition of concepts and computational skills
- Develop and teach reform-based lesson plans to children based on the Louisiana Components of Effective Teaching
- Identify and explore strategies adaptable for different populations of students

Required Activities

The list of required activities for this class will include, but not be limited to:

- Lesson Plans/Syllabi for the semester, year or quarter demonstrating planning
- A thematic unit incorporating a minimum of 10 lesson plans, demonstrating planning
- A scientific research project/experiment demonstrating knowledge of scientific methodology and design, and presentation of this project
- Lessons integrating mathematics, science, and data collection
- Lessons integrating science and technology
- Lesson integrating science and the community and current issues
- Discussion and evaluation of safety in science classrooms
- Field-based classes that take place out of the classroom
- Field hours in local classroom
- Discussion and evaluation of safety in science classrooms
- Science presentation lessons utilizing hands-on exploration, including lessons in the major branches of high-school science

Topics of Discussion

Topics covered in this class include, but are not restricted to:

- The nature of science
- The philosophy of inquiry-based science education
- The education of diverse learners in a science classroom
- Incorporation of mathematics in the teaching of science
- Units and measurement
- Major underpinnings in the teaching of
 - Earth Science
 - Biology
 - Chemistry
 - Physics

Preparation and Participation

You are graduate students and developing professionals. My expectation is that you will strive to make this course valuable for yourself and for your

classmates. Therefore, my expectation is that you will come to class prepared and on time, communicate with me in advance if you will miss class, and participate actively in class discussions and activities.

Class Attendance

Attendance in class is mandatory. Copying notes does not duplicate discussions and the sharing of ideas. There will be point deductions for lateness and missing classes. Please call a classmate for missed information. After three absences, please drop the course.

Some of the activities and lessons for this course will take place out of doors (in the field). Therefore some rearrangement of class times will be necessary to allow appropriate time in daylight hours. This may involve weekend or early afternoon meetings.

Grading

You are expected to attend all class meetings (see UNO attendance policy: <http://www.uno.edu/>) and submit all required course assignments on the designated due date in a professional and appropriate manner to demonstrate competency of the course objectives. Correct spelling and grammar are criteria that will be evaluated, so please proofread your work before submission. Assignments are to be completed *prior* to coming to class so that thoughtful and informed discussions can take place.

Late assignments are penalized 10% of their “graded value” for each day they are late (including weekends, holidays). You are expected to turn in your own work for credit, and while collaboration with others is encouraged, any indication that you are handing in any part of someone else’s work will be considered cheating and will be handled through university disciplinary channels (see UNO academic honesty policy (<http://www.uno.edu/>)). This includes, but is not limited to, wholesale copying of webpages or printed materials that are represented as your own work.

Please note that a grade on a project is neither a judgment of you as a person or of the amount of effort you spent, but rather of the quality of your work. In addition, this course and its activities will abide by all other stated UNO regulations, including, but not limited to the policy on sexual harassment (see UNO website: <http://www.uno.edu/>)

Those taking this course for graduate credit (5250) will have the additional requirement of designing and presenting a Project-Based Learning unit, and a written essay on the proper treatment and handling of animals and organisms in the classroom and in the contexts of teaching:

1. Attendance/Participation	10%
2. Student Experiments/Activities	10%
3. Quizzes	15%
4. Assignments	10%
5. Midterm Exam	15%

6 Final Exam	15%
7. Final Project	15%
8. Project-Based Learning Unit	10%
	<hr/>
	100%

- Failure in any one category can result in failure for the course
- An “A” grade is contingent on excellent work in all categories

Grades:

- A: 90-100
- B: 80-89
- C: 70-79
- D: 60-69
- F: <59

Assignments

Should be typed unless otherwise stated. Please include your name, course number, date and assignment title on everything you turn in to me. If an assignment contains multiple pages, please staple them together before turning it in. Legibility: if I can't read it, it's wrong.

Standards

The content and experiences of this course align with multiple professional standards as this course included in the program of study of multiple certification areas. Refer to http://coehd.uno.edu/educ/table_alignment.cfm for more information.

Field experiences included in this course support candidates to address unit, state, and national standards. Candidates are required to enter both the location number of field experience hours completed to meet the requirements of this course in to Live Text (the e-portfolio system). This requirement must be completed to earn any credit aligned with field experience assignments.

This course includes a candidate assessment that is a requirement for program progression.

COMPASS STANDARDS

- 1c. SETTING INSTRUCTIONAL OUTCOMES
- 2c. MANAGING CLASSROOM PROCEDURES
- 3b. USING QUESTIONING AND DISCUSSION TECHNIQUES

3c. ENGAGING STUDENTS IN LEARNING
3d. USING ASSESSMENT IN INSTRUCTION

OBJECTIVES	UNIT STANDARD	STATE STANDARD
-Demonstrate strategies for teaching and acquisition of concepts and computational skills	1A4, IIA7,	1c, 3b, 3c, 3d
-Develop and teach reform-based lessons to children based on the Louisiana Components of Effective Teaching	IB1, IIA1, IIA2,	2c,
-Identify and explore strategies adaptable for different populations of students	IIID1,2,3; IIA6,	3c, 3d, 1c
-Engage students in hands-on, inquiry-based lessons	IA1, 4; IIIA1,2,3; IIIC2,	3c
-Access and use national and state standards for elementary science teaching	IIA2, 4;	1c
-Understand key components of science from Biology, Earth Science, Chemistry and Physics	IIA1,2; IIIB1,2	

Conceptual Framework

Our conceptual framework, the theory-practice-research interaction model, permeates the programs preparing candidates for professional roles in school settings. As candidates progress through their professional studies, they are introduced to formal theories and concepts that are validated by research, which along with their personally held beliefs and assumptions, inform their professional practice. The roles and responsibilities set out the broad domains for developing competence of teacher candidates viewed through the lens of the theory-practice-research interaction model. As candidates engage in various clinical and field experiences included in their program of study, observation and study of professional practices inform and refine the educational theories and concepts they construct. Our goal is to have our candidates internalize the theory-practice-research

interaction model, as they develop into reflective practitioners constantly reassessing the educational theories, beliefs, and assumptions they embrace.

Objectives Alignment with Unit and State Standards

In addition to the identified goals and objectives, this course addresses UNO Teacher Roles and Louisiana State COMPASS Standards.

I. EFFECTIVE TEACHERS MANAGE CLASSROOM CONTEXTS AND ENVIRONMENTS

A. They establish a culture for learning by:

1. Managing classroom procedures (COMPASS 2c)
2. Managing student behavior
3. Organizing physical space
4. Organizing classrooms to integrate technology
5. Maintaining accurate records using available technology

B. They create an environment of respect and rapport by:

1. Using cultural contexts in the classroom
2. Demonstrating knowledge of diversity among students
3. Presenting rationales for change to meet students needs

II. EFFECTIVE TEACHERS DESIGN CURRICULUM AND INSTRUCTION

A. They understand and use curriculum and instruction by:

1. Knowing content
2. Knowing pedagogy
3. Setting instructional outcomes (COMPASS 1c)
4. Designing coherent instruction
5. Designing student assessments
6. Incorporating knowledge of diversity in the classroom
7. Planning for the use of technologies in curriculum and instruction
8. Demonstrating knowledge of resources, including technologies
9. Planning for the use of collaborative group practices in the classroom

B. They communicate effectively by:

1. Incorporating effective written communication in the classroom
2. Incorporating effective oral communication in the classroom

III. EFFECTIVE TEACHERS DELIVER INSTRUCTION AND ASSESS LEARNING

A. They engage students in active learning (COMPASS 3c) by:

1. Interacting effectively with students
2. Demonstrating flexibility and responsiveness
3. Integrating technology and other resources

B. They integrate disciplines into instruction by:

1. Applying connections to multiple disciplines
2. Demonstrating connections to real life

C. They use assessment in instruction by:

1. Incorporating performance tasks in the classroom
2. Using questioning and discussion techniques (COMPASS 3b)
3. Using pre-assessment, formative assessment, and summative assessment appropriately (COMPASS 3d)

D. They embed diversity in decision-making by:

1. Selecting resources
2. Delivering instruction
3. Assessing learning

IV. EFFECTIVE TEACHERS *PARTICIPATE IN PROFESSIONAL RESPONSIBILITIES*

A. They advocate for children, in terms of services and supports by:

1. Communicating with families
2. Demonstrating knowledge of resources in school and the community

B. They collaborate to improve professional practice by:

1. Engaging in a professional community
2. Participating in professional development
3. Collaborating with teachers and mentors
4. Developing goals for social justice
5. Using research-based practices that include current available technology

C. They reflect on teaching and learning by:

1. Focusing on cultural contexts and social justice
2. Collecting and analyzing data to improve practice

➔ Teacher Candidates will demonstrate competencies in integrating Common Core State Standards in lesson plans, unit plans, an