**Spadoni College of Education**

**Coastal Carolina University**

**EDEQ 728 Science, Technology, Engineering, and Mathematics (STEM) Methods and Materials for Diverse Students**

**Instructor of Record**:

**Email:**

**Phone:**

**Office Location**:

**Office Hours:**

**Meeting Date(s), Time, and Room:**

|  |  |  |
| --- | --- | --- |
| TBD |  |  |

**Course Description:**

**EDEQ 728 STEM Methods and Materials for Diverse Students (3):** This course focuses on the development of standards-based learning experiences in STEM (Science, Technology, Engineering, and Mathematics). Emphasis is placed on creating units that engage students in discourse, utilize inquiry, and encourage all students to participate in STEM learning.

**Course Alignment:**

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| **Course Objectives** | **Student Learning Outcomes** | **Standard Alignment** |
| 1. Emphasize the importance of analyzing, synthesizing and applying national and state standards. | 1. Know, understand, analyze and synthesize state and national curriculum standards for Science and Mathematics. | CF: 1.2  NBPTS: 2.2 |
| 2. Promote appropriate modes of inquiry for STEM-related topics. | 2. Modify and evaluate existing STEM instructional strategies to create a larger repertoire of strategies that promote active engagement, critical thinking, scientific inquiry and problem-solving. | CF: 1.3  NBPTS: 2.2, 3.3, 3.4, 5.2 |
| 3. Develop a repertoire of strategies for the active engagement, critical thinking, and problem-solving of all students. | 3. Articulate and distinguish how to create a more positive affective classroom atmosphere and culture of learning for all students, using differentiated instruction and culturally responsive approaches through STEM. | CF: 1.4, 3.2, 4.2, 4.3  NBPTS: 3.2, 3.4, 5.1, 5.2 |
| 4. Facilitate the continued use of technology to plan and support learning in STEM. | 4. Design a STEM-based inquiry unit, supported by technology and children’s and/or adolescent literature, utilizing appropriate objectives, learning experiences and assessments. | CF: 1.2, 1.3, 2.1  NBPTS: 3.2, 3.4, 4.0 |

CF= Conceptual Framework

NBPTS= National Board of Professional Teaching Standards

**Required Text(s):**

Glasgow, N.A., Cheyne, M., Yerrick, R.K. (2010). *What Successful Science Teachers Do: 75 Research-Based Strategies*. Thousand Oaks, CA: Corwin Press.

Young adult or children’s novel with science theme (to be discussed/determined in class)

**Other Required Course Materials:**

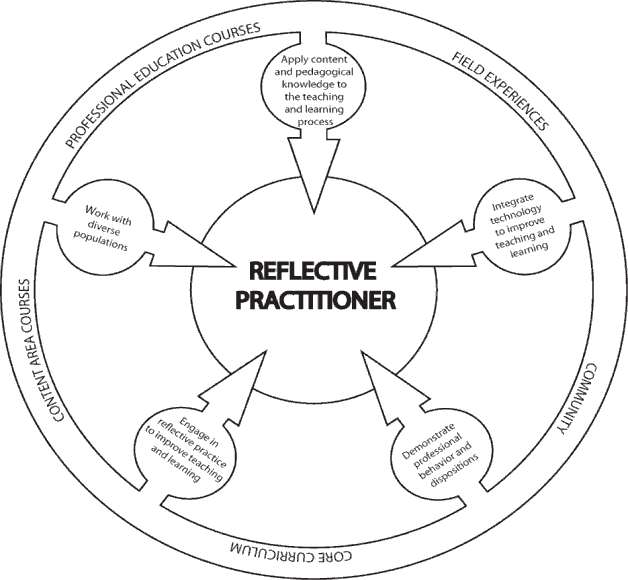
South Carolina State Department of Education Academic Standards for Science.

Next Generation Science Standards

Common Core Standards for Mathematics

**Conceptual Framework:**

The conceptual framework of all teacher preparation programs in the Spadoni College of Education is *The Teacher as Reflective Practitioner*. Through this framework, programs are directed toward the development of knowledge, skills, professional behaviors, and dispositions which will insure that all candidates are highly qualified and meet all university, state, and national expectations of pre- and in-service teachers at the completion of their respective programs of study. Intertwined in our professional unit are the INTASC Principles, NCATE standards, the state-mandated ADEPT framework, NBPTS Principles (MED programs only) and nine of the Specialized Professional Associations (SPA) standards.



**Spadoni College of Education’s Professional Behaviors and Dispositions addressed in this course:**

1.2 Understand instructional planning and design plans based on knowledge of subject matter, students, community, curriculum goals, and standards.

1.3 Use a variety of instructional strategies to encourage students’ development.

1.4 Manage the classroom and school to create a positive and safe learning environment.

2.1 Plan and implement effective learning environments and experiences supported by technology.

3.2 Evaluate, plan and provide appropriate activities and experiences to meet the needs of culturally and developmentally diverse student populations.

4.2 Demonstrate a belief that all students can learn and convey confidence and caring in their work with students.

4.3 Demonstrate professional behaviors and a commitment to fulfilling professional responsibilities.

**Academic Integrity Code:**

Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and reporting the inappropriate action of others and are committed to creating an atmosphere of mutual respect and trust.

Honor Pledge:

On my honor, I pledge:

• That I will take responsibility for my personal behavior; and

• That I will actively oppose every instance of academic dishonesty as defined in the Code of Student Conduct.

From this day forward, my signature on any University document, including tests, papers and other work submitted for a grade is a confirmation of this honor pledge.

**Attendance Policy:**

Students are expected to attend classes. If you must miss a class, you are responsible for obtaining any handouts, notes, or other information from a peer. In accordance with CCU policy, absences in excess of 25% of regular class meetings shall result in a grade of “F” for the course.

Candidates must be present for each and every class *and must take responsibility*

*for keeping an accurate record of their absences.* Professionally speaking, your principal will expect you to be in your classroom - everyday – unless an emergency or some other dire (and unforeseen) circumstance prevents you. The same standard applies in the Spadoni College of Education at CCU.

An absence does *not* absolve a candidate from the responsibility of submitting assignments on time, though decisions may be made on a case-by-case basis.

**Course Outline:**

1. Introduction/Overview of the Discipline
2. National and State Curriculum Standards for Science
3. Common Core Standards for Mathematics
4. Major concepts and modes of inquiry in the discipline
5. Creating a Culture of Learning
6. Positive affective climate
7. Strategies for active engagement
8. Critical thinking and problem-solving skills
9. Scientific and Mathematical Inquiry
10. STEM Discourse
11. Safety in the science classroom
12. Bringing the World into the Classroom
13. Learning experiences supported by technology
14. Access to and use of children’s literature
15. Field trips
16. Using local natural resources in the classroom
17. Exploring the local natural environment
18. Believing that all Students Can Learn
19. Expectations for student involvement
20. Meeting the needs of a culturally and developmentally diverse student population
21. Maximizing the benefits of inquiry for students
22. Teachers as Professional STEM Educators
23. Continuous learning in STEM
24. Professional development for you and your peers
25. Helping to design and promote the school STEM program
26. Reflective practices

**Course Requirements:**

Along with reading the textbook there will be other assignments included. All assignments are to be turned in at beginning of class on the due date.

**Course Assignments:**

1. **Attendance and Participation (30 pts)**

In this course it is impossible to be engaged in quality learning without taking these components seriously. Poor or late attendance, or not attending for full class time, may adversely affect your grade in the class. It is expected that students will refrain from scheduling any appointments during class time. When you are absent or tardy, you are missing components to the course that are difficult to recreate. 3 tardies (arriving late OR leaving early) will constitute one absence.

1. **Exams (2 exams at 50 pts each, total 100 pts)**

You will have two exams focusing on classroom activities and readings for the course. The questions will include both STEM-related content and assessment of best practices in STEM education. Questions will be short answer and multiple choice.

1. **STEM Blogs (100 pts)**

You will have a blog each week focusing on one topic in STEM education and how you will approach that topic in the classroom. You will be responsible for your blog and a response to at least one other colleague’s blogs. Topics will include, but are not limited to: Challenges in implementing STEM, trends and issues in STEM education, designing STEM-based activities for ELL learners, and assessment in STEM.

1. **STEM Platform Statement (70 pts)**

You will write a STEM platform statement explaining your claims as a STEM educator. This statement will include your beliefs regarding STEM in the classroom, ways you believe STEM should be implemented in the classroom, how you will teach STEM to diverse students, and how you will prepare yourself to use STEM in the classroom. You will revisit this statement at the end of the semester to modify your ideas and add justification and support related to the literature from class.

1. **Local STEM Field Trip Plan (100 pts)**

One of the topics of study for this course is STEM in the local community. As such, you will choose a STEM-related location within Horry, Georgetown, or neighboring counties to which you could take students on a field trip. You will design the fieldtrip, activities to be completed before, during and after the trip, and will make connections to the Next Generation Science and/or Common Core Mathematical Standards.

1. **Major Project – Inquiry Unit Plan (100 pts)**

You will design a unit of study for your students (5 lessons, with a pre- and post-assessment) focusing on one STEM-related topic. Your lessons must be inquiry-based and integrate technology and children’s literature, as well as connect to national curriculum standards.

**Grading Standards:**

Course grading is done based on a percentage of total points as well as assignment completion.

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| --- | --- |
| **Course Assignments/Assessments** | Point Value |
| 1. Attendance/Participation 2. Midterm Exam 3. STEM Blogs 4. STEM Platform Statement 5. Local STEM Field Trip Plan 6. Inquiry Unit Plan 7. Final Exam | 30  50  100  70  100  100  50 |
| Total Points: | 500 poimts |

As per the 2012-2013 CCU catalog on page 37, “course credit will be granted only for earned grades of **A, B +, B, C +, C, D +, D** or **S…** carry the traditional academic connotations of excellent, good, average, poor, and failing performance, respectively.”

Your grade in EDEQ 628 will come from the points accrued on the assignments described above. The following scale will be used:

A = 465 - 500 (93-100%)

B+ = 450 - 464 (90-92%)

B = 430 - 449 (86-89%)

C+ = 415 - 429 (83-85%)

C = 385 - 414 (77-82%)

D = 350 - 384 (70-76%)

F = below 350

**Other Course Expectations**

E-Mail: In the subject line always put your name and class section. As educators, you are expected to communicate professionally with your professors. Any written communication should be written in a professional style and free of grammar and writing errors.

Format: Unless otherwise specified, all work is to be turned in via Blackboard. All papers should be written in APA format, 12 point font, Times New Roman, 1 inch margins, double spaced, and paragraph form – not block. Use only the front of the paper. No hand written papers unless it is a required accommodation on your IEP or otherwise stated by the professor. All papers are expected to be written in a professional manner representing the excellent standards of teachers in this program. If there are too many mistakes in your written work, you will be asked to go to writing lab for help.

Submission of Work after Absences:

If you are absent, your work will be counted late unless it has appropriate written documentation attached when you submit it no later than one week after the due date. As per the 2012-2013 CCU catalog on page 33, “absences, excused or not, do not absolve a student from the responsibility of completing assigned work promptly. Students who miss assignments …will be allowed to make up the work in a manner deemed appropriate by the instructor. It will be the responsibility of the student to contact the instructor and make arrangements at the convenience of the instructor. The instructor is not obligated to allow the student to make up work missed due to an unexcused absence.”

Late Submissions:

Ten percent of the total grade for an assignment will be deducted for each day the work is late. This means that for a 100 point assignment, 10 points will be deducted each day for late work. “On time” means submitted during the class meeting time at the beginning of class.

**Campus Support Services**

Office of Disabilities:

If you have a learning disability or feel you need special accommodations, contact Counseling Services, Student Health Center Building, 204 University Blvd., 349-2305. Please schedule an IEP conference with me within the first 2 weeks.

Blackboard Assistance:

* <http://www.coastal.edu/blackboard> or through <http://learn.coastal.edu>
* the Blackboard Learn Guide for Students <http://libguides.coastal.edu/studentbb>

Student Computing Services:

* Check the website for hours, locations and other services: <http://www.coastal.edu/scs>
* Student Computing Services Main Help Desk: 843.349.2908
* Student Computing Services can be contacted via this request form: <http://www.coastal.edu/scs/index.html?type=workrequest>

**Representative Works Consulted:**

Abell, S.K., Appleton, K., & Hanuscin, D. (2010). *Designing the elementary science methods course*. New York: Routledge.

Barba, R. H. (1998). *Science in the multicultural classroom,* (2nd Ed)*.* Boston: Allyn and Bacon.

Brunsell, E. (2012). *Integrating engineering and science in your classroom.* Arlington, VA: NSTA Press.

Carin, A. A., Bass, J. E., & Contant, T. L., (2008).  *Activities for teaching science as inquiry* (6th ed.). Columbus, OH: Pearson Merrill Prentice-Hall.

Echevarria, J., Vogt, M., & Short, D.J. (2008).  *Making content comprehensible for English learners: The SIOP model.* New York: Pearson.

Lederman, N.G., Lederman, J.S., & Bell, R.L. (2004). *Constructing science in elementary classrooms.* New York: Pearson.

National Research Council. (2011). *Successful K-12 STEM education: Identifying effective approaches in science, technology, engineering, and mathematics.* Washington, DC: National Research Council.

Settlage, J. & Southerland, S. (2007). *Teaching Science to Every Child.* New York: Routledge.

**Tentative Course Calendar**

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| --- | --- | --- | --- | --- |
| Module | Week of | Topic Covered | Chapter Readings | Assignments |

Legal caveat/disclaimer: "The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning."