



The New York Center for Teacher Development, Inc.

In affiliation with the University of Massachusetts Global (Extended Education)

COURSE SYLLABUS

Course: EDZU 9112 Integrating STEM/STEAM into the Elementary Classroom

Credit Hours: 3.0 credits / 45 hours

Instructor: Brian Harvey

Course Description

The elementary science classroom has evolved tremendously over the years. It seems that most districts across the country are encouraging classroom teachers to implement more STEM/STEAM activities into their classrooms. This can be a very daunting task, even for the most seasoned educators. This course is designed to help you incorporate valuable and meaningful math, science and technology lessons and activities to your students. This class will give teachers the resources and background to get a better understanding of what STEM/STEAM is, and how to implement lessons effectively. Websites, apps, technology, literature and more will be shared among the class for everyone to use. This course is designed for grades K-6.

Course Objectives

Teachers Enrolled in This Class Will...

Know:

- what are the key components of teaching STEM/STEAM effectively
- what elementary STEM/STEAM classrooms really need
- the principles and components of effective STEM/STEAM instruction
- how to aid their students in thinking critically in a scientific setting
- useful literature to enhance co-curricular activities

Understand:

- the effectiveness of incorporating critical thinking and project based learning on a daily basis
- that wide varieties of resources and tools exist and preview a few
- the difference between traditional science lessons and STEM/STEAM lessons
- the positives, rationale and effectiveness of STEM/STEAM instruction

and To Be Able To:

- identify and discuss current instruction/strategies that enhance STEM/STEAM instruction
- make use of a wide variety of interactive websites that exist to support reluctant readers
- discuss the implementation of the strategies
- practice implementation of Tinkercad, WeVideo, Code.org and other online resources
- develop STEM/STEAM content knowledge
- reflect and develop their own teaching style and philosophy

Course Outline

Unit 1: Introduction

- Participants will be introduced to the basic layout of the course.
- Participants will examine the importance of STEM in the elementary classroom.
- Careers in STEM.
- Strategies to incorporate engaging lessons in the classroom.
- Literature in different content areas to help coincide with STEM activities.
- Participants will share ideas and literature with the group.

Unit 2: Mathematics and Science Practices

- Participants will share and discuss in a Forum what a STEM classroom looks like, and the components that would help them be successful. They will also analyze their current teaching methods with STEM, and how they hope to improve.
- Participants will explore and look into different resources for math instruction. Here they will find different activities to enrich their students. They will also discuss and share any current methods that they are using in the classroom.
- Participants will also look into various science related activities. They will explore websites and apps to better familiarize themselves as to what is offered and available to them.
- They will look at lesson plans designed specifically for their grade levels on phet.colorado.edu, a website that offers lessons in all areas of science and mathematics.

Unit 3: Virtual Field Trips and Digital Technology

- Participants will reflect in a Forum to discuss the importance of Virtual Field Trips and Virtual Hands On Experiments.
- Participants look at and explore various websites to assist in bringing different worldwide experiences to the classroom.
- Hands on labs for the students to explore. Tutorial Videos for WeVideo production, where the participants will learn the basics of producing digital stories that can be created and delivered to various media platforms.
- Application of a short video using basic video editing techniques.

Unit 4: Code.org and Tinkercad

- Participants will reflect in a Forum their experiences and thoughts on incorporating Coding into their classroom.
- A series of Tutorials to guide them and their students to understand what the basic fundamentals of Code.org is, and how it can be utilized.
- Participants will learn how to incorporate a grade level appropriate project to be used with their students.
- Participants will learn the basics of Tinkercad.
- Participants will watch and learn a series of ten, quick and easy instructional videos.

Unit 5: Graduate Level Students

For the Final Assignment, all Graduate Level participants will have the option of choosing between two of the four given assignments.

- Create a 2 minute video of your choice using WeVideo, following certain parameters given.
- One page lesson plan on how you would incorporate Code.org into a week's unit of study.
- Create a PowerPoint or Google Slides presentation of a project that you designed for your students to complete.
- Create a 3D Plant Cell model following the directions given by the instructor.

Methods of Instruction

Teachers enrolled in this course will utilize different resources to engage their students in the areas of STEM/STEAM. This is a course designed to equip teachers with the knowledge and skills to integrate Science, Technology, Engineering, and Math (STEM) concepts into engaging and interactive lessons. We will explore various resources, including articles and insightful videos, to solidify their grasp of STEM concepts and how they can be transformed into age-appropriate and engaging lessons. Teachers will learn how to utilize a variety of educational apps like WeVideo, Code.org and Tinkercad to enhance their teaching and empower students to explore STEM through interactive platforms. This course is designed to be interactive and hands-on, offering opportunities to collaborate with fellow educators, share experiences, and develop engaging STEM lessons for their classroom.

Methods of Assessment

Students who are taking the course for in-service credit must participate in all forum posts, readings, tutorials, and assignments.

Students who are taking this course for graduate credit and are working to attain a letter grade of “A” must complete all forum posts, readings, tutorials, and assignments. In addition, two assignments in Unit 5 must be completed with all required components.

Students who are taking this course for graduate credit and are working to attain a letter grade of “B” must complete all forum posts, readings, tutorials, and assignments. In addition, one assignment in Unit 5 must be completed with all required components.

Instructors are online each day of the course and correspond with students through the course itself, feedback on assignments, and e-mail.

Time Validation

Assignment	Time (in hours)
Forum Post: Personal introduction and layout of the course. Thoughts on current STEM instruction and what they would like to get out of this course.	1.00
Read the article, "Why Do Elementary Students Need STEM? It's Not What You Think" Watch the video, "STEM in Elementary, What is it? Why is it Important?"	1.50
Read the article, "Periodic Table of Math, Technology, and Science Occupations" Watch the clip, "STEM Careers- Why aren't kids interested in them?" Reflect and share your thoughts in the Forum on Careers and Jobs in the field of STEM.	1.50
Read the articles, "Tips and Strategies to Make STEM a Part of Your Everyday Classroom" and "The Future of STEM, Changing Perceptions." Short response needed on what you are doing now that is successful in your classroom, and what you can improve upon. Use strategies from the article and video to support your response.	1.50
Literacy in the STEM Classroom. Read the article and watch the video. Respond to the questions.	1.00
Assignment: Using the article and video that you previously read/watched, what are some of the books that you think would be beneficial to a STEM library? Create a list of 10 books that would be helpful in an elementary classroom.	1.50
Forum Post: Share a picture book with the class that you think would be a great addition. Summarize the book, and explain how it can be utilized effectively as a read aloud to engage the students.	1.00
Assignment: <i>Math</i> related activities in the STEM Classroom. Using the given websites and apps, answer the questions that are given. Browse the given activities and be prepared to share. Follow the instructions on the Phet website to complete the lab activity.	4.50
Assignment: <i>Science</i> related activities in the STEM Classroom. Using the given websites and apps, answer the questions that are given. Browse the given activities and be prepared to share. Follow the instructions on the Phet website to complete the lab activity.	4.50

Forum Post: Discussion on using technology to bring field trips to the classroom. Is this being done in your room? What are your thoughts on it, is it worthwhile?	1.00
Assignment: Explore the different offerings from the Museum of Science in Boston. Investigate the different activities and presentations that they offer. Explore the virtual field trips as well. Answer the questions and share what you thought were worthwhile.	3.00
Assignment: Watch the tutorial videos on WeVideo. Explore the different aspects that the program offers, including the library of stills, videos, and music. Answer the questions that go along with the activities. Create a free account, and explore how to create digital production.	4.50
Assignment: Create a one minute production following the parameters given and the knowledge that you have learned, Submit via email.	4.50
Forum Post: Coding, what are your thoughts and what is your comfort level? Is this something that you do with your students, if so, share some successes and struggles.	1.50
Assignment: Watch the tutorials on Code.org. This overview will show you the basic fundamentals on what the students will achieve. After watching the overview, what are some issues that you foresee? What are some of the benefits?	1.50
Assignment: Fundamentals of Code.org. Choose the Fundamental Lesson that is appropriate for your grade level. Complete the first 5 lessons in the Unit.	3.50
Assignment: Choose a project from Code.org to incorporate into your classroom. Explain what the project is, and why you chose it. What skills would the students need in order to be successful in this unit?	3.50
Assignment: Create a free Tinkercad account and complete the 10 Basic Tutorials lessons on Three Dimensional Design. Once the tutorials are completed, create a design of your choice and upload a screenshot to the class. Make sure the techniques learned in the tutorials are used.	4.00
Total Time	45.00