Idaho State University | Albion Center for Professional Development

STEM: Elementary Engineering Design

Course Syllabus

Course Description

The purpose of this professional development course is to help elementary teachers looking to incorporate engineering design and STEM into their pedagogy. Engineering design, an integral part of STEM education, is an engaging, hands-on method focused on problem-solving, perseverance, and integration of content. It is also a ripe environment for developing interpersonal skills like communication and collaboration. As such, this course will present engineering design as the central vehicle for learning rather than a fun add-on to a lesson or unit. Learners will understand what engineering design looks like at the elementary level, how to plan meaningful engineering projects for students, and how to guide students through the process.

This course enhances classroom teaching effectiveness and supports improved student outcomes by introducing new knowledge in implementing engineering design in elementary STEM education, with strategies to plan equitable projects, manage collaboration, and assess learning in engineering contexts.

Course Objectives

At the end of this course you should be able to:

1. Define STEM education and list three specific benefits it offers to elementary students.
2. Identify and describe the five main components of the engineering design process.
3. Evaluate an elementary engineering project and highlight three traits that make it high-quality.
4. List at least two cognitive and two social-emotional benefits of engineering education for young learners.
5. Apply three best practices to design an original K–5 engineering lesson plan.
6. Describe two strategies for maintaining a collaborative and inclusive classroom culture during group engineering projects.
7. Identify three assessable elements in a sample engineering activity and explain how each can be evaluated.
8. Analyze one current trend in equity in STEM and propose two instructional practices that support inclusive engineering education.

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Modules

- Module 1: Introduction to Elementary STEM Education, Quiz 1
- Module 2: Engineering and its Design Process, Quiz 2
- Module 3: What Engineering Looks Like in K-5, Quiz 3
- Module 4: Why Teaching Kids Engineering Matters, Quiz 4
- Module 5: Instructional Design for Engineering K-5, Quiz 5
- Module 6: Managing Engineering Activities, Quiz 6
- Module 7: Assessment, Quiz 7
- Module 8: Equity in STEM and Engineering, Quiz 8

Grading:

Each quiz must be passed at an 80% or higher (three attempts allowed).

Format

This is a self-paced, asynchronous (no required live meetings) course. Throughout the PD course, you will find it helpful to take notes along the way to assist with the quizzes. Within each module, you will find reflection assessments that are not graded but will help in your journey through the course. There is an interactive forum in the course to help you connect with peers and instructors, share ideas, and collaborate on best practices throughout your learning journey.