DEVELOPING COMPETENCE IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM)

Overview and goals

What does being competent in science, technology, engineering and mathematics mean? Does it make sense to consider an unique competence covering four different areas? How can the students develop that competence? What strategies, resources and tools can teachers use? This course aims introduce and give examples of actions and tasks that provide opportunities to develop STEM competence in students. We will explore in detail problems of modeling and some aspects of scientific inquiry, as well as we will discuss the use of technology to gather data from surroundings and thus propose contextualized and authentic tasks.

Goals:
- Understand the foundations, features and capabilities of the areas of mathematical competence, basic competences in science and engineering, and technology from a holistic point of view.
- Identify and analyze good practices for the development of STEM in students from different educational levels.
- Propose tasks of mathematical modeling and scientific inquiry.
- Locate and use repositories of resources to design learning activities on STEM.

Contents

PART 1: LA COMPETENCIA STEM. SIGNIFICADO E IMPLICACIONES
1.1. Meaning of STEM
1.2. STEM in the international education field
1.3. Authenticity and realism in school tasks

PART 2: MODELING IN MATHS AND SCIENTIFIC INQUIRY
2.1. Mathematical modeling. Phases, types and fundamentals
2.2. Teaching and learning science by inquiring

PART 3: USE OF SENSORS AND ENVIRONMENTAL DATA GATHERING
3.1. Modeling with the use of technology
3.2. Robotics: advances and open questions

Assessment

Assessment criteria and instruments
- Attendance, active involvement, daily work: 40%
(Due to the theoretical and practical nature of the course, regular class attendance is essential. To qualify for the assessment of the course is considered indispensable attending at least 80% of classes)
- Partial test: 30%
- Final test: 30%

References