


Course: STEAM Education	
Type and level of studies: MAS	
Study program: International Teacher Education Programme	
Teacher(s): Aleksandra Mihajlović, Milan Milikić, Olivera Cekić-Jovanović	
Language of instruction: English	
ECTS: 6	
Prerequisites: /	
Semester: Fall semester	

Course objectives:

- Familiarization with STEAM Education: Introduce students to the principles and framework of the STEAM educational approach, emphasizing its interdisciplinary nature and significance in modern education;
- Integration of Disciplines: Equip students with the skills to effectively blend content from Science, Technology, Engineering, Arts, and Mathematics to foster holistic learning experiences;
- Classroom Management and Environment: Develop students' abilities to organize and manage STEAM classrooms that promote inquiry, critical thinking, problem-solving, and creativity;
- Instructional Design and Practices: Train students in designing and implementing STEAM-based instructional strategies, including project-based and inquiry-based learning.

Learning outcomes:

- Demonstrate Understanding of STEAM Framework: Articulate the core concepts and components of the STEAM educational approach and its relevance to contemporary teaching;
- Integrate STEAM Disciplines: Effectively plan and implement lessons that incorporate and synthesize content from multiple STEAM disciplines to enhance student learning outcomes;
- Design STEAM Learning Experiences: Create and execute lesson plans that utilize project-based and inquiry-based learning methodologies, encouraging active student engagement and collaboration;
- Facilitate a STEAM Classroom: Develop strategies for managing a STEAM classroom environment that fosters creativity, critical thinking, and a culture of inquiry among students;
- Evaluate STEAM Instruction: Assess and refine STEAM teaching practices based on feedback and reflective practices to ensure effective learning experiences.

Course contents:

Introduction to STEAM (Science, Technology, Engineering, Arts, Mathematics) Education (Overview of STEAM principles and historical context; Comparison of STEAM with traditional STEM education; Importance of integrating the Arts in STEAM); Understanding the STEAM Framework (In-depth exploration of each discipline: Science, Technology, Engineering, Arts, and Mathematics; Interdisciplinary connections and real-world applications); Designing STEAM Instruction (Principles of instructional design for STEAM education; Development of STEAM curricula and lesson plans; Creating learning objectives that integrate multiple disciplines); Effective Teaching Strategies for STEAM (Project-based learning: principles and implementation; Inquiry-based learning: fostering curiosity and critical thinking; Student-centered active learning: strategies for engagement and collaboration); Creating a STEAM Learning Environment (Online tools and resources for facilitating STEAM education; Strategies for managing virtual classrooms and promoting collaboration; Techniques to encourage creativity and innovation in online settings); Assessment and Evaluation in STEAM (Formative and summative assessment methods for STEAM learning; Reflective practices for continuous improvement in STEAM teaching); Capstone Project (Design and present a comprehensive STEAM lesson plan; Peer review and feedback to enhance collaborative learning; Reflection on the integration of course content into practice).

References:

1. Khine, M. S., Areepattamannil, S. (2019). STEAM Education: theory and practice. Cham: Springer.
2. Sousa, D., Pilecki, T. (2018). From STEM to STEAM: Brain-Compatible strategies and lessons that integrate the arts, Thousand Oaks: Corwin, a SAGE publishing company.
3. Johnson, C., Peters-Burton, E., Moore, J. T. (2016). STEM road map: a framework for integrated STEM education, New York, Oxon: Routledge.
4. Quigley, F. C., Herro, D. (2019). An educator's guide to STEAM: engaging students using real-world problems, New York: Teachers College Press.
5. Li, Y., Zeng, Z., Song, N. (eds.) (2024). Disciplinary and Interdisciplinary Education in STEM, Berlin: Springer.
6. Needles, T. (2020). STEAM Power: Infusing Art Into Your STEM Curriculum, USA: International Society for Technology in Education.
7. Chatterton, C. (2018). Awesome Science Experiments for Kids: 100+ Fun STEM / STEAM Projects and Why They Work, USA: Callisto Kids.

Number of active teaching hours**Other classes**

Lectures: 30

Seminars: 30

Project work:

Independent work:

Teaching methods:

Lectures (including tutorials and seminars, class is a combination of theoretical and practical activities), independent study, project work and presentation.

**Examination methods
(maximum 100 points)**

Exam prerequisites	No. of points:	Exam prerequisites	No. of points:
student's activity during lectures		oral examination	
practical classes/tests		written examination	
seminars/homework		project presentation	30
project	70	portfolio	
other		Other	

Grading system

Grade	Number of points	Description
10	91 – 100	Excellent
9	81 – 90	Exceptionally good
8	71 – 80	Very good
7	61 – 70	Good
6	51 – 60	Passing
5	≤50	Failing