



LILIE, LLC Course Information

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Title of Course (45 hours): STEAM Education

Course Description:

Science, Technology, Engineering, Arts, and Mathematical elements all wrapped in one. Join us in learning more about this educational framework created for all disciplines and types of learners. It is an integrative, multi-disciplinary avenue for teaching the inter-relationships of how subjects relate in real-life. By adding the arts element educators will learn new ways to: stimulate and develop the imagination, refine cognitive and creative skills, strengthen problem solving and critical thinking skills, nurture team-building, cultural and alternative perspective values, and develop a sense of craftsmanship and goal setting skills needed in the classroom and beyond.

Overall Course Objective and Expectation(s):

- Articulate the concepts, principles and core STEAM characteristics
- Understand the reasons why 21st the transition from STEM to STEAM is important
- Encourage integration of Art + Design in K-20 education
- Develop an understanding of how to provide STEAM learning opportunities to your students
- Identify ways to incorporate innovative, creative, technology based activities into daily lessons
- Acquire knowledge of STEAM resources, techniques, strategies and ideas to improve instruction
- Explore the multi-dimensional connections between artistic, scientific, and mathematical knowledge

Course Instructional Materials:

All courses maintain a fully developed and dynamic webpage that houses all resources, reference material and various other required informational texts, videos and alike that is both active and relevant to course objectives and content. Course web pages are routinely updated to reflect most current research and available readings therefore instructional materials used to teach course objectives are subject to change.

Instructor Consultation and Interaction:

Real time consultation and instruction is provided through the LILIE, LLC discussion boards for each course/classroom on a daily basis.

Suggested Readings, Websites, Articles & Videos *(subject to change)*:

No Permission Required: Bringing STEAM to Life in K-12 Schools by [Susan M. Riley](#)

From STEM to STEAM: Using Brain-Compatible Strategies to Integrate the Arts by [David A. \(Anthony\)](#)

[Sousa Thomas J. Pilecki](#)

The Maker Movement Manifesto: Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers by [Mark Hatch](#)

STEAM Point: A Guide to Integrating Science, Technology, Engineering, the Arts, and Mathematics through the Common Core by [Susan M. Riley](#)

Creating Innovators: The Making of Young People Who Will Change the World by [Tony Wagner](#)

Proof of Course Completion:

LILIE, LLC is committed to assuring that enrollees fully participate in and receive the educational benefits contemplated by the course. Enrollees must demonstrate participation by making detailed postings designed to foster dialogue among colleagues and instructors. These enrollee postings must be made four times each week in separate sessions. Enrollees will be required to submit a detailed log documenting at least 45 hours of course work, including discussion board posts, and will be required to apply information and strategies acquired from the course content to weekly classroom instruction. Attempts to falsify logs or discussion board entries will result in denial of credit and a report to the enrollee's employer.



Scope & Sequence/Weekly Topics and Objectives

Week 1

Topic(s):

During week 1, we will make introductions and discuss the research behind STEAM-based education. Through the readings and videos, we will review and learn about the benefits of STEAM.

Objectives:

Teachers will: articulate the philosophy of a STEAM-based education, review and explain the research behind the transition from STEM to STEAM and identify the foundational beliefs of why STEAM is important.

Impact on Classroom Instruction:

Participants will familiarize themselves with the history, philosophy and principles behind STEAM. They will use the conversations and resources shared throughout the course to help prepare students for “bridging the gap between business and educational goals to create a more productive and sustainable global culture based on teamwork.” (Yakman)

Learner Outcomes:

Teachers will identify informative, helpful resources to transition current learning environments in to learning environments infused with STEAM-based activities through respectful engaging dialogue with others.

Assessment of Understanding and Learning/ Weekly Assignments *(including but not limited to posting requirements set forth by LILIE, LLC):*

Reading & Video Assignments, Plus Discussion Questions.

1. What does the research say about the benefits of a STEAM-based education?
2. Explain the differences between the 3 styles of STEAM education?
3. STEAM delivers high quality team-based education to all students. In what ways is STEAM a whole-learner, community-involved and influenced learning environment?
4. Share your reaction to your results of the STEAM initiative quiz.

**Topic(s):**

During week 2, we will explore creativity, STEAM curriculum and lesson plans. We will begin to discover the positive, transformative effect STEAM will have on our students' learning and success. Through the readings and postings, we will learn how other educators have implemented STEAM activities into their own practice.

Objectives:

Teachers will become familiar with strategies for incorporation of more creative, artistic activities into their educational setting. They will explore the use of more diversification of teaching methods and become more of a facilitator to learners. They will also explore STEAMs connection to different learning standards.

Impact on Classroom Instruction:

Planning STEAM activities increases student engagement, exploration and evaluation of information, mastery of the content and creates a climate of student ownership in learning which increases student efficacy.

Learner Outcomes:

Once teachers are comfortable with the practicality of STEAM and figuring out creative ways that the activities can be used to increase student engagement, learning and content/ skill mastery, they will create and implement STEAM lessons in to their own classrooms with confidence and efficacy.

Assessment of Understanding and Learning/ Weekly Assignments *(including but not limited to posting requirements set forth by LILIE,LLC):*

Reading & Video Assignments, Plus Discussion Questions.

1. Explain the 5Es of instructional learning? How do they connect to STEAM? Why incorporate them?
2. Identify and describe 5-8 ways to incorporate creativity into your educational setting?
3. View Claremont Graduate University list of STEAM journal resources. Choose 5 organizations and discuss relevancy to your content area.
4. How can you see yourself incorporating elements of STEAM in to your educational environment? Briefly explain and begin creation of a lesson. Prepare to share activity/lesson ideas in Week 4.



Week III

Topic(s):

During week 3, we will investigate ways to introduce innovative lesson plan and project ideas to your students including new technology based products/techniques/apps. Through the use of these STEAM-based ideas, teachers will create a collaborative, positive, successful ways for students to synthesize new information.

Objectives:

Teachers will show students various technologies. They will decide which method or technology will work best with their ELL, special needs, gifted student and general education populations. These tools and technologies will allow for greater understanding, mastery and differentiation.

Impact on Classroom Instruction:

As teachers increase their toolbox of STEAM technology options to share with students they will understand which strategy/tech option works best to accomplish learning goals and targets.

Learner Outcomes:

Teachers will become better facilitators of information by teaching in a STEAM-based environment. They will be given the tools to become the “guide on the side” instead of the “sage on the stage” allowing students to problem solve, create, tinker, and explore more independently.

Assessment of Understanding and Learning/ Weekly Assignments (*including but not limited to posting requirements set forth by LILIE, LLC*):

Reading & Video Assignments, Plus Discussion Questions.

1. Choose at least two STEAM related *educationcloset* articles and 5 more organizations from Claremont Graduate University list of STEAM journal resources and articulate how you might incorporate them.
2. How can students’ learning using STEAM techniques influence their overall learning experience? How is STEAM connected with the Maker Movement?
3. After looking over parts 1 and 2 of *Getting Creative with Digital STEAM* workshop, discuss the arts advantage and project based learning.
4. Which technology based STEAM tool(s), technologies, product(s), program(s) or app(s) might help all of your students. Explain how and why for at least 3-5 of them?



Week IV

Topic(s):

In week 4, we will discuss how good, effective, interactive, STEAM education can help our students, and ourselves, successfully create college and career ready students.

Objectives:

Teachers will: review STEAM strategies, techniques and resources that relate to engagement, creativity, innovation, problem solving, collaboration and student success; analyze the learning experience in this course by reflecting on professional practices since the beginning of this course and reflect on previous goals set.

Impact on Classroom Instruction:

The more emphasis focused on a well-rounded, relevant, connected science, technology, engineering, ARTS, math based education the better students will be able to synthesize information and prepare for their college and/or career pathways. When students are presented with information in a cohesive, all subject inclusive plan they become more actively involved, engaged, independent problem solvers and successful students.

Learner Outcomes:

Teachers will become better facilitators of information by incorporating the arts as well as science, technology, engineering and math into their teaching. STEAM-based education is invaluable to synthesis of information and helping students become college and career ready. Learners will benefit greatly from a STEAM-based educational environment where creativity, innovation and connection are the driving factors.

Assessment of Understanding and Learning/ Weekly Assignments *(including but not limited to posting requirements set forth by LILIE, LLC):*

Reading & Video Assignments, Plus Discussion Questions.

1. Post detailed STEAM lesson plan/activity discussed in Week 2. Explain rationale behind it. Provide feedback and evaluation of others'.
2. List ways that incorporating a STEAM approach can help prepare students to become life-long learners in pursuit of college, skilled trade programs, potentially yet unknown career paths and well-balanced lives.
3. Explain how you plan on getting your students more engaged and better at synthesis of information and learning by connecting literacy and STEAM.
4. Write a reflection of your learning based on course materials and discussions. Include a comparison of what prior beliefs/goals had been versus now with explanation on how you view STEAM education, what is your vision, what can be achieved and how will you reach it.