LILIE, LLC Course Information

**More detailed course curriculum can be provided upon request*

Title of Course: STEM and the New Generation

Course Description: The new Common Core State Standards have placed a great emphasis on Mathematics and English Language Arts. Science, Technology, Mathematics and Engineering achievement in the United States has received greater attention as the nation continues to be a major competitor in the world economy and in the research and development of new technologies. This course provides a general overview of the three initiatives that will drive the curriculum across all areas of K-12 education. The course starts with an overview and a brief history of STEM initiatives as well as the reasons why these subject areas are critical to the success of American students. Participants will examine the most recent college readiness reports based upon student performance in various benchmark indicators and will gain a deeper understanding of the importance of these critical areas and their role in the Common Core Learning Standards. Participants will have an opportunity to conduct in-depth analysis and review of the Next Generation Science Standards and how these will direct K-12 education in the 21st century. Participants will also research and utilize STEM resources and lesson plans for their own classrooms. During the course a pedagogical analysis of STEM standards will permit participants to examine how courses in specific content areas can complement and support STEM education to further prepare students for college and competitive careers.

Overall Course Objective and Expectation(s):

The objectives of this course are to understand what STEM education is. We will learn about the overview and history of the STEM initiatives. We will also learn about NGSS and discuss the links between STEM. We will identify the STEM programs in college as well as the future job markets. Discuss the benefits STEM has in education and the future of our students to be college ready. We will design STEM lessons that can be incorporated into the classroom.

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

The course is an asynchronous online course that is available for instructor and student participation 24/7. The four week duration of the class is broken down into four weekly sections each comprised of lecture in the form of instructor created articles and content, web links to academic and professionally reviewed articles in the discipline of general education, and instructor created discussion questions which are, in and of themselves, formative assessments to determine the extent to which the enrollees have comprehended and mastered the information and begun to apply it to their personal teaching practices. The answers to these questions are the basis for the class interaction, as enrollees are required to respond to each other within the classroom arena.

By providing a wide variety of professional articles, peer reviewed journal pieces and researched instructor created content that addresses the needs of all K-12 educators and by encouraging interactive dialogue among the enrollees, this course will encourage and require application, discussion and peer feedback of said strategies and understanding in teaching students within a teacher's own individual classroom practices. The discussion and feedback will give us our own meta-assessment of useful, research based and practiced strategies and techniques for addressing the needs of our varied students thus giving them more opportunity to truly excel.

Proof of Course Completion:

LILIE, LLC is committed to assuring that enrollees fully participate in and receive the educational benefits provided by the course. Enrollees must demonstrate participation by making detailed postings designed to foster dialogue among colleagues and instructor that reflect the content, skills/ strategies learned and assessments covered in course. These enrollee postings must be made six times each week, in separate sessions, and including a minimum of 4 academic posts and at least 2 peer-peer comments of others' postings and possible shared assignments. Enrollees are required to submit a detailed reflection in combination with the archived work. Attempts to falsify record 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 I

Topic(s):
During week 1, we will make introductions and discuss the research behind STEM education. Through readings and videos, we will review the benefits of STEM

Objectives:
Participants will answer the question "What is STEM". The will research the overview and history of the STEM initiatives. They will also research the college readiness report and understand the importance of STEM for the future generations.

Impact on Classroom Instruction:
When participants learn what STEM is and the meaning behind the initiatives it allows for greater impact on instruction and educational goals in the classroom.

Learner Outcomes:
Teachers will identify informative, helpful resources to transition current learning environments in to learning environments immersed with STEM based activities through engaging dialogue with others.

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

1. Participants will assess the responses of other participants' in relation to STEM resources.
2. Participants will provide detailed explanations, with evidence from readings and resources about how STEM is important for future generations from articles, websites and videos.
3. Participants must provide detailed postings to foster a dialogue among colleagues and instructors.

Week II

Topic(s):
During week, 2 participants will learn about the NGSS (Next Generation Science Standards) and its implementation into current curriculum. Discuss the link between NGSS and STEM. Through readings and postings, we will learn how other educators have implemented STEM activities into their own practice as well as how to incorporate STEM into elementary and middle levels.

Objectives:
1. Identify what the NGSS are.
2. Discuss how NGSS is linked to STEM
3. Participants will research how to incorporate STEM in the elementary schools.
4. Participants will research how to incorporate STEM in the middle levels among various content areas.

Impact on Classroom Instruction:
Learning about the NGSS and STEM and how to implement it into the current curriculum and eventually become the curriculum students learn strategies on how to become more of a problem based learner.

Learner Outcomes:
Once teachers are comfortable with what STEM is and how to incorporate they can figure out activities to increase student engagement. They will create and implement STEM lessons in to their own classrooms.

Assessment of Understanding and Learning/ Weekly Assignments *(including but not limited to posting requirements set forth by LILIE¸LLC):*
1. Identify NGSS.
2. Discuss the link between NGSS and STEM.
3. Discuss how to incorporate STEM in the elementary schools.
4. Discuss how to implement STEM in the middle levels.

Week III

Topic(s):

During week 3, we will explore the changes occurring in colleges and universities in regards to STEM majors and programs. We will research the benefits of STEM education. Research and discuss the current job market for STEM occupations. Begin designing lesson plans to incorporate STEM into the classroom.

Objectives:

1. Colleges and Universities, how are the majors and degrees changing for students, what colleges have STEM programs?
2. Participants will research the benefits of getting a STEM education and the current job market for STEM occupations.
1. Begin planning and sharing with colleagues through discussion board, the preliminary activities or activities that promote STEM based education.
2. How can you incorporate STEM in to your educational environment? Briefly explain and begin the creation of a lesson

Impact on Classroom Instruction:

Learning about what STEM is and how it will impact future generations and the jobs will help teachers know how to facilitate the type of learning that students need to be successful. Teacher will know how to develop students in thinking into a more problem based learning across all subjects.

Learner Outcomes:

Teachers will become better facilitators of information by incorporating STEM based activities into their teaching. STEM based education is invaluable to the synthesis of information and helping students become college and career ready. Learners will benefit greatly from a STEM-based educations 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):*

1. Read article "Top 25 STEM Colleges 2017" and comment.
2. Read the following articles "STEM Occupations: Past, Present, And Future" and "The STEM Workforce: An Occupational Overview" and post comments.
3. Participants will learn and research how to promote STEM in the classroom
4. Begin creating STEM lesson plans

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Week IV

Topic(s):
In week 4, we will discuss how strong, effective, interactive STEM education can help our students and ourselves to successfully create college and career ready students.

Objectives:
1. Participants will design lessons plans as per their subject area and incorporate it into the classroom.
2. Critically read and assess other teacher's plans and results as a way to further expand your own understanding and expose students to STEM based activities/lessons and apply learned information, skills and understanding through effective feedback.
3. Modify plans if applicable for individual grade level and content area using results of lessons, feedback from peers and instructor and post any modifications with explanation.

Impact on Classroom Instruction:
The more emphasis focused on a well-rounded, connected science, technology, engineering and math based-education the better the students will be able to synthesize information and prepare for their college and career pathways.

Learner Outcomes:
Teachers will become better facilitators of information by incorporating the arts as well and science, technology, engineering, and math into their teaching. STEM-based education is at the basis of helping students into a more problem based thinking to become college and career ready. Learners will benefit greatly from STEM 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):*

1. Post a detailed STEM lesson plans/activity.
2. Discuss the ways that incorporating STEM into the classroom helps students become for problem based learners for life.
3. Discuss Why STEM? Success Starts With Critical Thinking, Problem-Solving Skills:
4. Explain how to get students thinking critically, able STEM to solve multiple discipline problems, Cross-Curricular Critical Thinking Is Integral to STEM Success
5. Write a reflection of your learning based on course materials and discussions. Include a comparison of what prior beliefs/goals had been versus now