



EDUC 914—Advanced Instructional Theory and Practice: Mathematics and Science

Understanding and Promoting STEM Careers (4 credits)

Course Instructor: Andrea Infantino/Pat Hamblett

Dates: June 4 - September 19, 2008

Format: Online interactions/discussions plus four face-to-face sessions

Course Description:

The course will focus on providing participants with a deeper understanding of the STEM workforce challenge and present specific ways to bring more resources about STEM (Science, Technology, Engineering and Math) careers into the classroom. Participants will experience STEM careers through a summer externship in a field related to their teaching content expertise, and broaden their knowledge of STEM careers beyond their summer externship experience via research and speaker presentations. Participants will learn how to integrate a passion for their content with "real world" experiences as a means of exploring and promoting STEM careers for their students.

Exploration and application of communication and other 21st Century skills will be emphasized. Participants will learn the basics of visual literacy and formal "stand and deliver" skills/techniques in conjunction with the development of PowerPoint slide presentations about their externship experience and content areas. Through online discussion within Blackboard, collaboration, and knowledge sharing, participants will connect their externship experiences and their teaching practice to further enhance their instructional repertoire in science, technology, engineering and mathematics content.

Course Objectives:

1. Provide a better understanding of the STEM workforce challenge
2. Enhance teacher knowledge of STEM careers
3. Provide strategies for supporting student understanding of potential STEM career choices
4. Define 21st century skills (e.g., problem-solving, collaboration, analysis), explore how they are used in the workforce, and how to incorporate them into teaching and learning
5. Integrate visual literacy and presentation strategies for effective communication skills
6. Connect curriculum content in the classroom to "real world applications"

Course Expectations/Requirements

Participants will:

1. Review current articles and studies to inform and enhance their practice
2. Research, collect, and develop STEM career materials and resources that can be integrated into their curriculum and student activities
3. Participate in a summer STEM externship experience related to their content/skills expertise



Course Expectations/Requirements (cont'd)

4. Share their externship experiences and demonstrate the relationship of their externship to their teaching practice and content knowledge
5. Learn how to incorporate PowerPoint into their instructional practice by developing and presenting two PowerPoint presentations related to: (1) their externship experience and (2) STEM content
6. Plan and conduct a leadership event related to the LIFT²/STEM experiences for their school district during the 2008-09 school year
7. Arrange and conduct a student field trip to their STEM externship company
8. Plan and conduct interviews with STEM professionals to be shared with colleagues and students

Materials

Friedman, Thomas I. (2005) "It's a Flat World" *The New York Times*, NY, NY.

Jackson, Shirley Ann, Ph.D. (2004) "The Perfect Storm: A Weather Forecast" (Speech given at American Association for the Advancement of Science Annual Meeting). Seattle, WA

"Did You Know?"(2007) video created by Raytheon

Augustine, Norman R. (2007) *Is America Falling Off the Flat Earth?* The National Academies Press, Washington, DC available online: www.nap.edu/catalog/12021.html

"Ready for What? Preparing students for college careers and life after high school." *Education Week*: Volume 26, Number 40, June 12, 2007.

Burmark, L. (2002). *Visual Literacy: Learn to See, See to Learn*. Alexandria, VA: Association for Supervision and Curriculum Development.

Pink, Daniel H.(2006): *A Whole New Mind, Why right-brainers will rule the future*. Strand, London, England: Penguin Books Ltd.

Douglas, J., Iverson, E. Kalyandurg, C. (2004). *Engineering in the K-12 Classroom*. Washington, D.C.: American Society for Engineering Education.

Engineering: Go For It!(2007). Washington, D.C.: American Society for Engineering Education.

Forbes, C. (2005). *Those Amazing Engineers*. American Council of Engineering Companies.

MassINC and the Center for Labor. (2007). *Mass Jobs: Meeting the Challenges of a Shifting Economy* Boston, MA: MassINC.

STEM Websites

Grading Criteria

F-2-F Participation-25%

Online Participation-25%

Assignments-50%

Survey/Extern Report- grade withheld until complete