

Workshop Title: Preparing engineers for a globalized economy:
How to teach engineering students process skills.

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Workshop duration: 3 hours

Workshop description:

Process skills (problem-solving, lifelong learning, critical thinking, self-assessment, change management, communication and collaboration, etc.) have always been important in any education and work setting. However, new challenges presented by a new, globalized economy, have put a new focus on these skills in the engineering workplace. For example, the US Accreditation Board for Engineering and Technology (ABET) introduced in 2000 new Engineering Criteria for evaluating engineering programs (EC 2000) that emphasize process skills. These skills present a great challenge for educators and practicing engineers alike because they are hard to define explicitly and even harder to develop.

Process skills depend on attitudes and values as much as they depend on content knowledge. For educators the challenge is three-fold: (a) how to clearly define these skills, (b) how to assess them, and (c) how to effectively teach them to their students. The workshop addresses the design and implementation of curriculum that prepares engineering and technology students for the challenges of a globalized economy. More specifically, it presents course design elements that address process skills. In particular, participants of this workshop will have an opportunity to:

1. Discuss the need for process skills in the 21st century engineering workplace, especially in light of the challenges presented by globalization.
2. Define process skills – describe the attributes of engineers who are lifelong learners, problem-solvers, cope well with change, etc.
3. Design an engineering course of their choice that uses their familiar technical content as a vehicle to teach students process skills. This will involve defining learning outcomes, choosing appropriate instructional methods, and assessment.

The workshop format will combine direct instruction, individual practice, working in small groups, group sharing and discussion. Participants will have an opportunity to develop their own tools and processes that suit their specific needs.

The proposed workshop is directly in-line with the general conference theme of *Enhancing 21st Century Skills for Global Engineers and Technology Professionals* and

fits in the first of the suggested topics for a workshop (*21st century graduate attributes and competencies in engineering education*).

Presenter's Bio:

Dr. Nikos J. Mourtos (www.engr.sjsu.edu/nikos/) is a professor of Mechanical & Aerospace Engineering and the Associate Chair for Aerospace Engineering in the Department of Mechanical & Aerospace Engineering at SJSU. He received his BSME from the University of Patras in Greece (1980) and his M.S. (1982), Engineer (1983), and Ph.D. (1987) degrees in Aeronautical and Astronautical Engineering from Stanford University. He has taught courses in a variety of mechanical and aerospace engineering subjects. His research interests encompass Aerodynamics, Aircraft Design, and any aspect of Teaching, Learning, and Assessment in Engineering Education. He has served as the Faculty Instructional Development Coordinator for the College of Engineering (1996-2002), a Faculty-in-Residence for Innovative Pedagogy for the Center for Faculty Development and Support at SJSU (1998-2002), the Assessment Coordinator in the Department of Mechanical and Aerospace Engineering (2002-2006), and the Assistant Director for the Center for Faculty Development and Support at SJSU (2006-2008).