

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

Presenters:

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Workshop description:

Process skills (problem-solving, communication, teamwork, self-assessment, change management, and lifelong learning) 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, especially in light of the need to standardize engineering education (ex. 1999 Bologna Declaration) 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 knowledge. For engineering educators the challenge is both how to effectively teach these skills as well as how to assess them. The workshop will address the design and implementation of curriculum that prepares engineering students for the challenges of a globalized economy. More specifically, it will present 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 engineering workplace of the 21<sup>st</sup> century, 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 that uses 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.

Profile of the expected audience: engineering educators, practicing engineers, engineering managers.

Maximum number of participants: 30

**Dr. Nikos J. Mourtos** ([www.engr.sjsu.edu/nikos/](http://www.engr.sjsu.edu/nikos/)) is a professor of Mechanical & Aerospace Engineering at SJSU. He received his B.S. in Mechanical Engineering 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 subjects, such as Introduction to Engineering, Introduction to Aerospace Engineering, From Insects to Jumbo Jets: The Science of Flight, Mechanics, Dynamics, Fluid Mechanics, Aerodynamics, Propulsion and Aircraft Design. His research interests encompass Aerodynamics, Aircraft Design, as well as any aspect of Teaching, Learning, and Assessment in Engineering Education. Dr. Mourtos has served as the Faculty Instructional Development Coordinator for the College of Engineering (1996-2002), as a Faculty-in-Residence for Innovative Pedagogy for the Center for Faculty Development and Support at SJSU (1998-2002), and as the Assessment Coordinator in the Department of Mechanical and Aerospace Engineering (2002-2006). He is currently the Assistant Director for the Center for Faculty Development and Support at SJSU.

**Dr. Isabel Huet** has a Ph.D. in Education and is currently a Research Fellow at the Universities of Aveiro and Bristol. Her research interests include teaching and learning approaches in Higher Education with emphasis on engineering education. She has been working very closely with first-year programming faculty members and students at the Universities of Aveiro and Strathclyde (Glasgow), where she is exploring new teaching and learning approaches, e-learning, collaborative learning, and linking teaching and research in Higher Education.