The Global Engineering Faculty Institute - GEFI

Proposal

To be submitted to IFEES Executive Committee

Title

Global Engineering Faculty Institute

Leaders and Contact Information

- Anette Kolmos, President of SEFI; UNESCO Chair in Problem Based Learning in Engineering Education and Professor in Engineering Education and PBL, Aalborg University
- Lueny Morell, President of IFEES and Program Manager, Strategy and Innovation Office, HPLabs
- Others (ASEE-US, SEFI-Europe, ABENGE-Brazil, ISTEC/LACCEI- LA, AEES- Africa, ISTE/IUCEE- India and CSEE-China)

Brief Description

The proposed initiative would create the **Global Engineering Faculty Institute (GEFI)**, a global faculty leadership training institute that would provide development, capacity building and training to engineering and related disciplines professors, graduate students and other interested individuals attending IFEES and members' events. The GEFI would be hosted and organized by IFEES members and universities hosting IFEES and members' events.

Objectives

Provide faculty leadership development activities (workshops, seminars, courses) leveraging IFEES members and other distinguished faculty training leaders worldwide. The Institute would encourage national and internationally known engineering educators and organizations that have a successful history and experience in engineering education faculty training to provide descriptions of their workshops, seminars, courses and offer them through this Institute (see examples attached to this proposal). GEFI offerings would be posted on the IFEES and member organizations website. Events' hosts (IFEES member or local university/organization) would browse the various faculty leadership development opportunities and select those they want to offer as their conference pre-post-activities. It would be the duty of the IFEES member and/or conference host to contact institute leaders and discuss their interest of conducting workshops/seminars/courses. Hosts would commit to organizing the training event(s), cover event(s) leaders' travel and registration costs and honoraries. They would also agree to market the event and register participants. Hosts would agree to pay IFEES 10% of the total registered in the faculty development activities. In this manner, the GEFI would be a self-sustaining initiative for IFEES. Possible workshops/seminars/courses GEFI could broker to offer include: Problem and Project Based Curriculum Innovation (see both workshops' description in the addendum), Assessment and ABET Accreditation, Effective Teaching, Ethics across the Curriculum, Designing Outcomes Based Courses; Strategic Planning; and other workshops of interest to the engineering education leadership across the world.

Metrics and Outcomes Assessment

A series of outcomes assessments (qualitative and quantitative) will be done to evaluate the program success, including: number of faculty development activities carried by EFI; number of training events per year and per venue; satisfaction of training events attendees; satisfaction of training leaders; satisfaction of events' hosts; external funds obtained to sponsor GEFI events; outreach and publications of outcomes, and other metrics deemed pertinent.

Timetable

It is proposed to start IFEES EFI in 2011 during the IFEES Summit and General Assembly to be held in Lisbon, Portugal.

Addendum

Examples of possible workshops - next pages

WORKSHOP TITLE (2 days)
Problem and Project Based Curriculum

PRESENTERS
Anette Kolmos (UCPL, Aalborg University)
Erik de Graaff (Delft University of Technology, Aalborg University)

DESCRIPTION
According to the EU presidents and prime ministers Higher Education is the key to success in the knowledge economy. Engineers are needed to sustain and maintain our modern society. The Bologna process aims to stimulate the development of a successful and strong Higher Education sector in Europe. Innovative educational methods like Problem and Project Based Learning, which are based on student centered learning constitute an important success factor. This workshop training offers participants the opportunity to learn about Problem and Project Based Learning and to develop the ability to analyze and reflect on the processes of teaching and learning. The focus of the workshop will be on practice exercises in case writing and process facilitation.
Competence objectives: After the workshop the participants will be able to design, and analyze various types of student centered educational programs, to setup effective cross disciplinary projects for PBL and to evaluate their own performance as a process facilitator.

MATERIALS
Data projector, sound equipment, flip charts, multi color sticky notes and markers (# will depend on number of registrants – we would like to have one flipchart for every 8 participants, if possible. If not, please have sufficient flipchart paper available for attendees).

DELIVERY MODE
The workshop is run by a team of international recognized experts in the field of PBL and Engineering. The workshop leaders have over 30 years experience, running workshops and giving 100+ keynote presentations in local and international venues. The workshop involves a combination of active learning and reflection (working in teams on assignments and interacting with the workshop leaders).

WORKSHOP OUTLINE
- Day 1
  - Welcome, Introductions, Objectives and Expectations
  - Design of PBL curriculum
  - Projects and PBL in Engineering Education, Cases from Aalborg University
  - Collaboration across disciplines
  - Learning styles and teaching styles
- Day 2
  - Writing effective project assignments
  - The teacher as facilitator of the learning process
  - PBL Facilitation skills
  - Reflections and Plans for cooperation
  - Workshop Evaluation

COSTS
- Travel, hotel and per diem expenses
- Workshop leaders' honoraries
- Workshop materials

WORKSHOP LEADERS' BIOS

Erik de Graaff (1951) graduated at the University of Amsterdam in 1978, majoring in the psychology of work and organisation. From 1979 till 1990 he has been involved in the development of the Problem Based curricula of medicine and health sciences at the University of Limburg in Maastricht. In 1990 he was invited to join TU Delft in order to support the process of educational innovation at the Faculty of Architecture. Dr de Graaff has been a visiting research professor at the University of Newcastle, Australia in 1995 and a guest professor at Aalborg University in Denmark since 1999. The collaboration with Aalborg University in Denmark resulted in an appointment as adjungeret professor in 2007 and part-time professor in 2010. Erik de Graaff has contributed to the promotion of knowledge and understanding of higher engineering education through publications and through participation in professional organisations like SEFI – the European Society of Engineering Education, IGIP – The International Society for Engineering Pedagogy and ALE – Active Learning in Engineering Education. In 2006 Erik de Graaff was appointed as associate editor of the European Journal of Engineering Education. Since January 2008 he is Editor-in-Chief of the EJEE.

Anette Kolmos: President of SEFI (European Society for Engineering Education) Professor in Engineering Education and PBL and Chairholder for UNESCO Chair in Problem Based Learning in Engineering Education, Aalborg University. 2009-2011. Dr. Kolmos has a PhD in "Gender, Technology and Education" (1989). During the last 20 years, she has conducted research in the following areas,: Change to PBL curriculum, development of transferable skills and faculty development. She is actively involved in developing profile of Engineering Education Research in Europe as well as internationally. She was first chair of the SEFI working group on Engineering Education Research. Dr. Kolmos is associate editor for European Journal of Engineering Education, SEFI and served as associate editor for Journal of Engineering Education. She has published more than 150 articles in various books and journals. She is coordinator for the EU-project, Socrates project, PBL-Engineering which has developed the master programme: Problem Based Learning in Engineering and Science.

WORKSHOP TITLE (2 days)

Curriculum Innovation: Bridging the Gap between the Way We Teach and the Practice of Engineering

PRESENTERS

John S. Lamancusa (Penn State University, Professor of Mechanical Engineering)
Lueny Morell (Hewlett-Packard Company, Program Manager, Strategy and Innovation Office, Hewlett Packard Laboratories, Palo Alto, CA)

DESCRIPTION

According to the World Bank Institute, a well prepared human capital in science and technology is one of the four key pillars that support knowledge based economies. Therefore, a well educated engineering workforce is fundamental for innovation and entrepreneurship. But there's a big gap between how engineering is currently taught and the practice of engineering. Colleges of engineering need to engage in effective curriculum innovation processes to better respond to a country/region's needs. In this 2-day workshop, attendees will have an opportunity to become aware of global science and engineering trends, reflect on their current curriculum and teaching models, the importance of building industry-university partnerships and the continuous quest for excellence through outcomes assessment and accreditation. Presenters will highlight the process, components and outcomes of the Learning Factory, a curriculum innovation program that focuses on hands-on learning, real industry projects and continuous assessment of learning outcomes, which was awarded the 2006 US National Academy of Engineering Gordon prize.

MATERIALS

Data projector, flip charts and markers (# will depend on number of registrants – we would like to have one flipchart for every 5 participants, if possible. If not, please have paper available for attendees).

DELIVERY MODE

Delivered by a team of academic and industry leaders, this course will show the importance of bottoms-up innovations enhanced by top-down leadership support working in partnership with industry stakeholders. Workshop modules involve a combination of theory and practice with active learning (working in teams and interacting with workshop leaders). Workshop leaders have over 10 years and 80+ workshop delivery experience, in local and international venues.

WORKSHOP OUTLINE

- Day 1
  - Welcome, Introductions and Workshop Expectations
  - The Imperative for Engineering Education Innovation and Reform
  - Overview of the Learning Factory and Penn State Outcomes
  - Learning Factory Outcomes at the University of Puerto Rico - Mayagüez
  - Basics of Curriculum Innovation
- Day 2
  - Innovative Teaching Methods
  - Effective Capstone Design Project Courses
  - Continuous Quality/Outcomes Assessment and Accreditation for ABET
  - Building and Sustaining Industry Partnerships
  - Final Reflections, Plans and Workshop Evaluation

COSTS

- Travel, hotel and perdiem expenses
- Workshop leaders' honoraries
- Workshop materials

WORKSHOP LEADERS' BIOS

Lueny Morell, M.S., P.E.,

Lueny Morell is a Program Manager in the Strategy and Innovation Office staff of Hewlett Packard Laboratories (HPL) in Palo Alto, California. She is responsible for facilitating external research collaborations for HPL and lead initiatives focused on R&D talent development, collaborating with external partners (government entities and other corporate labs) to pursue strategies and initiatives of benefit to the research community. In the past, she was in charge of developing engineering/science curriculum innovation initiatives worldwide in support of HPL research and technology areas and former director of HPL University Relations for Latin America and the Caribbean in charge of building research and education collaborations with universities throughout the region. Before joining HP, Lueny was full professor of Chemical Engineering at the University of Puerto Rico - Mayagüez (UPRM) where she held positions at the Campus and UPR system level, including director of Campus Research Center. An ASEE Fellow, she is recipient of the 2006 US National Academy of Engineering Bernard M. Gordon award and the 2009 LACCEI Academic Merit Medal for her leadership and global impact on engineering curriculum innovation and fostering industry-university partnerships in support of economic development, her work in curriculum, research, accreditation and economic development activities has been published in more than 80 papers, book chapters and journals. She is a licensed engineer, ABET reviewer and member of various national and international boards including the US National Science Foundation International Science and Engineering Advisory Committee, ASEE International Advisory Committee and President of the International Federation of Engineering Education Societies.

John S. Lamancusa, Ph.D., P.E.

John S. Lamancusa is a Professor of Mechanical Engineering and Founding Director of the Learning Factory at Penn State. He also serves as a technical expert for the National Science Foundation in the Engineering Education and Centers Division. Before coming to Penn State in 1984, he was employed at AT&T Bell Laboratories where his technical experience included electronic packaging, product design and acoustic design of telecommunications equipment. At Penn State, he teaches courses in design, vibrations, noise control, product dissection and mechatronics, and supervises senior design projects. He is the faculty advisor for Penn State's student chapter of Engineers without Borders. Professor Lamancusa received his Ph.D. in mechanical engineering, with a minor in electrical and computer engineering, from the University of Wisconsin-Madison in 1982. Dr. Lamancusa earned his B.S. in mechanical engineering from the University of Dayton in 1978. Professor Lamancusa is a past Vice President of the Board of Directors for the American Society of Engineering Education, a Research Fellow of the Humboldt Foundation and a registered professional engineer. He was awarded the 2006 Gordon Prize for Innovation in Engineering Education by the National Academy of Engineering, and the Joel Spira Outstanding Educator Award by the American Society of Mechanical Engineers. He is a Fellow of the American Society of Engineering Education (ASEE) and of the American Society of Mechanical Engineers (ASME).