



UPRM-Microsoft-Hewlett Packard The Learning Factory and ABET 2000

The Manufacturing Engineering Education Partnership, or MEEP (UPR-Mayagüez, Penn State and University of Washington), has developed an undergraduate manufacturing engineering - product realization option which addresses various issues of the new ABET 2000 criteria, specifically criteria 2 and 3. The result of this program is the **Learning Factory**, an outcomes-based curriculum integrated to laboratory facilities and industry collaboration. At each of the schools we implemented the courses shown above and integrated them with existing courses to form minors or options in **Products and Processes Realization**. In this new curriculum, the Interdisciplinary Capstone Design Course, with "real projects" provided by our industrial partners, form the final test of the students' ability to function in an emulated industrial environment. At UPRM, the model program has been expanded through a NASA grant to institutionalize a remote sensing and GIS practice-based option with undergraduate research and student internships.

In August 1998 UPRM obtained support from the **National Science Foundation (NSF)** to disseminate the Learning Factory program model. The major venue was through the offering of four (4) workshops at national engineering education conferences. This grant was complemented by a grant from **Raytheon Company** to offer additional workshops at Historical Black Colleges and Universities and Hispanic Serving Institutions. More recently, **Microsoft Research** has been sponsoring workshops at leading institutions in Latin American countries where the company is establishing their strategic academic alliances. More recently, **Hewlett Packard** has joined in the sponsorship of these events. Workshops have been organized and supported by UPRM's Center for Hemispheric Cooperation in Research and Education in Engineering and Applied Science (CoHemis). Founded by an NSF grant in 1991, it brings together national science and technology organizations (ONCyTs) delegates from many countries of the Americas to discuss ways to increase hemispheric collaborations in science and technology. Currently, CoHemis maintains relationships with most of the hemisphere's ONCyTs through officially designated liaisons.

To this date, 23 workshops have been offered at national and international venues to more than 700 attendees. As a result, the program has served many institutions and faculty in program and curriculum reform. Learning Factory courses have been adapted and laboratory facilities developed, as well as industry collaboration started or enhanced. In Latin America, the workshop has served as forum for discussing regional, national and international accreditation initiatives and strategies.

The **Learning Factory Workshop** goes through the steps that helped MEEP develop this program: from establishing educational objectives to planning (resources, timetable, and responsibilities) to curriculum development (courses, integrated laboratory facilities, industry collaboration), and finally to outcomes assessment (designing the assessment strategy, conducting assessment, design of tools, reporting and feedback). Attendees have an opportunity to work on developing an engineering student profile and planning for adopting/adapting the Learning Factory Program at their institutions. As mentioned above, the workshop also presents detailed description of ABET criteria and accreditation process, as well as UPRM strategy to comply with these.

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