Abstract

Engineering is a practical discipline. It is a hands-on profession where doing is a key element. Practicing engineers use research laboratories and development laboratories to obtain experimental data to guide them in designing and developing a product and/or to determine if a designed product performs as intended. Engineering students, on the other hand, need to go to laboratories to build up essential skills and abilities required for the engineering profession in general, and particularly those required to deal with industrial research and development laboratories.

In January 2002, ABET, with support from the Alfred P. Sloan Foundation, held a 3-day colloquy to explore the issues related to the true goals of students’ undergraduate lab experience. The aim was to determine, through consensus, taxonomy of laboratory learning objectives, which could be validated and disseminated throughout the educational community. A final list of 13 objectives was developed as the desired outcomes of a successful lab experience accumulated over an engineering curriculum.

In the present work a practical approach is presented to meet these fundamental objectives. A set of students’ learning outcomes for an experimental design course is developed together with a set of assessment rubrics for different types of lab experiments. Also an assessment rubric for the write-up given to the students for a design of experiment is also presented.

The work is complemented by a form to evaluate student’s lab experience in an engineering program. The form is used to develop an action plan to improve this lab experience as a case-study of a program preparing for an ABET accreditation visit under EC2000.