The role of technical standards in engineering, technology and computing curricula

by Dr Saurabh Sinha

Technical standards are established norms or requirements. They are usually available as formal documents that determine uniform engineering, technical, performance and interoperability criteria, methods, processes and practices. Among their uses are the setting of specifications at the onset of a design, defining constraints during the detailed design process, and serving as benchmarks during testing.

Introducing standards in the classroom will augment the learning experience by pointing students to available design tools and to best industry practices. Student knowledge of standards would facilitate the transition from classroom to workplace by aligning educational concepts with real-world applications and market constraints.

General intent

Along with its activities in the area of standard development, the Institute of Electrical and Electronics Engineers (IEEE) is committed to the development and dissemination of educational material about standards.

Recognising that the role of standards in current engineering, technology and computing (ETC) academic curricula is often unclear, and that most graduates of ETC programmes receive little systematic education on standards, the IEEE desires to redefine and enhance the integration of standards in academic education.

The integration of standards in ETC curricula may be achieved in several forms, including the following:

- By reference – indication that a process or a device is covered by a technical standard and a citation of the standard.
- By introducing the principal technical specifications of a standard – an indirect introduction to a technical standard by extraction of principal aspects of the standard and incorporating them in classroom instruction, homework assignments, laboratories or projects.
- By direct use of a published standard (or a significant excerpt of a published standard) in classroom instruction, homework assignments, laboratories or projects.
- By regular use of and reference to technical standards in large-scale projects, especially last-year design or “capstone” projects.

The IEEE makes the following recommendations regarding the role of technical standards in the curriculum of academic programmes in ETC: exposition to standards by reference should be made the norm in all ETC curricula, and the goal should be assisted by increased use of textbooks that review and include references to technical standards.

The IEEE recommends that during their last or next-to-last academic year, ETC undergraduate students in standard curricula should be exposed multiple times to introductions to the principal technical specifications of a standard. Such introductions can be provided through in-classroom instruction, homework assignments, laboratories or projects.

The IEEE recommends that during their last or next-to-last academic year, ETC undergraduate students should be exposed to at least one instance of extensive direct use of a published standard.

The IEEE recommends that, to the extent practicable, last-year design or “capstone” projects should make regular use of technical standards, and that the relevance and applicability of technical standards should be part of progress and final reports on such projects. Among the proposed activities is a “standards search” at the commencement of each project, paralleling the common patent and literature searches.

**The above views were presented as an IEEE position paper by Dr Saurabh Sinha, Chair: IEEE South African Section and member of the IEEE Educational Activities Board (EAB), delivered on behalf of the IEEE Board of Directors.*