Practical Ideas from Professors: Standards Education in Your Courses

Teaching Standards in Communications: Strathclyde University

University of Strathclyde Engineering

About our Engineering Program at Strathclyde

Strathclyde University EEE Department teaches 4-year honors, 5-year integrated Masters programmes and 1-year specialist Masters programmes to some 600 students specialising in electronic engineering, or doing joint degrees with mechanical engineering and computer science. The motto of the institution is 'A Place of Useful Learning', and as well as teaching fundamentals, we place emphasis on practical applications and industry needs. Introducing students to standards forms a key role in this process.

Program details:

Modules consist of 72 contact hours over two 12 week semesters. In addition, students are expected to spend roughly 130 hours of private study time on each module. Modules are worth 20 credits (usually split 50:50 between coursework and a final examination) and students normally study 6 each year. Most of the lecture time is spent on fundamental principles, and the tutorial time is spent on short questions and starting to apply these principles to real problems.

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My specialism is communications, and almost all real world systems in this area make significant use of standards. Rather than attempting to give an overview of all relevant standards, which is simply impossible given the number which would need to be considered, I try to introduce students to how to use standards through project based learning.

For more Practical Ideas for Professors visit www.ieee.org/education_careers/education/standards/educators_resource_library.html

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Using Standards in the Engineering Program

As well as using standards case studies to show practical application of technologies, standards are taught through assignments the students complete as part of the coursework element. Depending on the specific course, examples of how I use standards are:

- Asking students to summarise different standards (for different communication systems), and compare their main features
- Propose a suitable standard for a particular application
- Identify the trade-offs for a particular technology choice in a standard, and try to second-guess why that choice was made
- Design an extension to a standardised system (for example, a new mobile phone service)
- Implement a standardised communication component in Matlab®

Depending on the size of the task, students may undertake them individually or be formed into groups of 3 or 4 to attempt them. A single report is produced from the group, with peer marking, so that students can agree (or argue for) a weighted split of the overall mark. Another option is for groups to report back to the class by means of short presentations on the standards they have investigated. For this task, different groups are given different standards. This exposes the class to a wider variety of standards.

In all cases, students are given access to the standards, and given pointers to good summaries in papers and textbooks. However, they have to research the standards themselves and find and select the relevant parts for study, which is a useful exercise for aspiring engineers.

Overall, students appreciate the relevance of standards, and employers like the fact that students have practical experience with standards.