

Catholic University of America

School of Engineering

Engineering Management Program

Strategic Standardization Curriculum

(CMGT 564 - 2013)

The purpose of *Strategic Standardization* is to create a level of awareness for graduate engineering students on significant issues associated with standards and the process of standardization, public policies and legal issues related to standardization. Today's world is heavily dominated by engineering, science and technology issues. The course represents a crossroads between engineering, science, technology, public policy and law. In short, the course offers graduate students a chance to examine engineering, science, and technology issues from a public policy and legal perspective. The range of public policy issues covered in the course includes national standards strategies, health, safety, the environment, energy, sustainability, international trade, engineering ethics and potential legal risks.

The Nature of Standards and Standardization

The field of standardization is a complex, multidisciplinary environment. It is of critical importance that individuals who practice in the field of standardization have a multidisciplinary perspective, the ability to analyze multidisciplinary environments and the ability to communicate their analysis effectively to interested parties. Individuals who successfully practice in the field of standardization typically have a set of multidisciplinary skills and experience drawn from the following areas: engineering, science, technology, economics, business, international trade, public policy and law. *It is noteworthy that technology standards control access to every product in commerce in the global marketplace, therefore, the standardization process used by every company, industry, and nation is critical to the growth and development of every national economy, and the global economy as a whole.*

Consider, for example, some of the strategic issues associated with standardization. Globalization is rampant and will remain so for the foreseeable future. (*The World is Flat*, Thomas Friedman (2005)).¹ Standards influence everything we do (UK National Standards Strategy (2003)). Standards control markets (German National Standards Strategy (2005)).² Standardization is a major source of competitive intelligence (European Academy for Standardization (2009)).³ In short, standardization programs offer one of the best, most important means to evaluate current technology, provide a glimpse of where future technology innovations may occur, and offer a major opportunity to influence the development of new technology.⁴

¹ <http://www.thomasfriedman.com/worldisflat.htm>

² http://www.din.de/sixcms_upload/media/2896/DNS_english%5B1%5D.pdf

³ <http://www.euras.org/uploads/2009presentations/bousquet-standardization.pdf>

⁴ *Id.*

Standardization programs are indispensable for the strategic evaluation of technology and the analysis of competitive issues. In strategic terms, “If you control an industry’s standards, you control that industry lock, stock, and ledger” (*Out of the Crisis*, by W. Edwards Deming, Center for Advanced Engineering Study, MIT at 302 (1986)). “In short, global private [standards] regulations should be understood and analyzed as an intensely political process, even if the politics may be hidden beneath a veneer of technical rhetoric.”⁵

Standards are defined in many different ways. Consider, for example, the following definition of standards by the United States Office of Technology Assessment submitted to Congress in 1992:

Standards govern the design, operation, manufacture, and use of everything mankind produces. There are standards to protect the environment, human health, safety, and to mediate commercial transactions. Other standards ensure that different products are compatible when hooked together. There are even standards of acceptable behavior within a society. Standards generally go unnoticed. They are mostly quiet, unseen forces, such as specifications, regulations, and protocols that ensure that things work properly, interactively, and responsibly. How standards come about is a mystery to most people should they even ponder the question. With the evolution of global markets, standards are even more important to facilitate international trade. Unfortunately, they may also be used as trade barriers or to gain advantage over foreign competitors. The United States has been fortunate to have a pluralistic, industry-led standards setting process that has served us well in the past. Whether it will continue to do so in the future in the face of bruising international economic competition is uncertain (*Global Standards: Building Blocks for the Future*, Forward, U.S. Office of Technology Assessment Report to Congress (March 1992)).⁶

For over 100 years, the National Standards Policy of the United States has been the private sector will lead in the development of consensus standards and the government will play a supporting role (National Technology Transfer and Advancement Act (1995)). The United States standardization system is the most diverse standardization system in the world. According to the U.S. Department of Commerce, there are at least 600 individual standardization groups in the United States representing virtually every industry in commerce. It is estimated there are approximately 800 private sector standards setting organizations in the world as a whole.

The United States System is a “bottom up” system in which the private sector has the leading role. All other national standardization systems are essentially “top down” systems in which the government has the leading role. At the global level, IEEE estimates that 500,000 technology standards are the technology foundation for the global economy, and it costs at least \$1.5 billion each year to maintain the global standardization system.

The future of the United States economy depends, in significant part, on effective management of its standardization system and effective participation in development of international standards. It is estimated that at least 50% of current United States standards

⁵ See Buthe & Mattli, *The New Global Rulers* (2011) at 12.

⁶ http://www.princeton.edu/~ota/ns20/year_f.html

practitioners will retire in the foreseeable future (3-5 years). Standards education and training of the next generation of practitioners is therefore a critical issue.

The Need for Effective Education Programs on Standards and Standardization

In the 2008 article *Education is the Key to the 21st Century*, Professor Shiro Kurihara, Hitotsubashi University, Tokyo, Japan, offered the following comments on a survey by The Center for Global Standards Analysis that established an urgent need for standards education programs:

The national economy of every nation depends upon its ability to develop and maintain an effective international standards system best suited to its needs. Given that standards are the essential building blocks by which every nation develops and maintains a competitive national economy, the challenge is to develop international standards education programs which meet the specific needs of a particular country in their private, public and academic sectors. For decades, private corporations, government departments and agencies have carried the burden of standards education by preparing their best and brightest employees to work in the complex field of international standardization [in the form of “on the job” training]. There is no question that international standards education programs offered by private corporations and government departments must be continued and expanded where ever possible. But in today’s fast-paced and highly competitive world, are these efforts enough? A key question we must now address is whether nations need to make significant investments in creating academic opportunities for their best and brightest students to study the complex field of international standardization.⁷

Faculty

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Curriculum

1. A Bridge To The Future

- Review History of Standards and Standardization
- Review curriculum, Course Overview and Congressional Report - “Global Standards – Building Blocks for the Future” (1992), research paper and grading requirements.

2. United States Standardization System I (private sector)

- Review organization, structure, standards development organizations, consortia groups, due process and standardization procedures of United States standardization system; review United States Standards Strategy (2005)

⁷ See: http://www.nist.gov/standardsgov/upload/Purcell_CUA_SupportingDocs_Education-is-the-Key-to-the-21st-Century.pdf

3. United States Standardization System II (public sector)

- Review United States Constitution provisions concerning standards.
- The role of government in standardization, e.g., The National Institute of Standards and Technology, Office of United States Trade Representative.
- Organization of the public sector structure, and due process procedures for the United States standards system.

4. United States Standardization System III (public policies)

- Review basic management policies of the Federal government regarding Standardization, OMB Circular (A-119 1998).
- Review United States Statutes such as the National Technology Transfer and Advancement Act and the Standards Development Organization Advancement Act.
- Review the federal public policy of *Incorporation by Reference*.
- Review 2011 NIST Report prepared for White House National Science and Technology Council

5. Standards & Trade I

- Review definition of international standard, International standards development organizations, processes and procedures for development of international standards.
- Review “The Strategic Value of International Standards”

6. Standards & Trade II

- Review roles of United States corporations, international standards development organizations, consortia and United States government in facilitating trade.
- Review role of World Trade Organization.

7. Strategic Standards Management

- Review corporate strategic standard management plans.
- Review competitive intelligence gathering.

8. Testing, Certification and Conformity Assessment

- Review programs and definitions for testing, certification and conformity assessment.
- Review public policy and legal issues associated with testing, certification and conformity assessment.

9. Public Policy & Legal Issues I

- Review relationship between private sector and public sector standards; use of private sector standards by government and antitrust issues.

10. Public Policy & Legal Issues II

- Review public policy issues associated with standardization of health, safety, and environment (duty of due care).

11. Public Policy & Legal Issues III

- Review public policy issues associated with standardization and intellectual property.

12. Class Presentations

Grade

Research Paper (90%): A student may select any research topic related to development of a technology standard, or engineering management of technology issues (e.g., ISO 9000 or ISO 14000), approved by faculty. Students are required to submit a one page outline of their research proposal to faculty for approval by June 30. The outline should include an abstract statement of no more than 3 sentences that describes the purpose of the research.

The paper's format must include: (1) a Title Page, (2) a Table of Contents, (3) a length of 15-20 pages (with 1 inch margins) and double spaced...length does not include the title page, table of contents, references at the end of the paper or attachments). Footnotes and citations must be according to the enclosed format for citations. The text of the paper should be appropriate for graduate research; i.e., statements should be supported by relevant footnotes and/or citations. **The paper is due on the last day of class.** Research paper examples are available at www.strategicstandards.com.

Class Presentation (10%): A student is expected to make a power point presentation the last day of class lasting 10-15 minutes based upon their research paper. Presentation examples are available at www.strategicstandards.com.

Laptops: Laptops are permitted in class for the purposes of taking notes or making a presentation.

Recording Lectures: There is no objection to recording class lectures.

Email, telephone numbers & appointments: Faculty is available by email, telephone, prior to or following class, or by appointment.

Attendance: Good scholarship requires the presence of students at all classes. The responsibility for prompt and regular class attendance rests upon the individual student. If, for any reason, a student is absent too frequently from class, it may become impossible for that student to receive a passing grade. Authority for excusing absences rests with faculty who may request the student

obtain authentication of absences considered unavoidable. Grades for a student may be modified according to the number of *unexcused* absences set forth below:

1 unexcused absence - no modification

2 unexcused absences - reduction of final grade by one half grade, e.g., B to a B-

3 unexcused absences - reduction of final grade by one full grade, e.g., B to a C

4 unexcused absences - If a student has 4 unexcused absences, he/she will be requested to withdraw from class.