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Largest Software Engineering curriculum redesign in 20 years integrates Systems Engineering Principles

International multi-year effort to create 21 st century Software Engineering Curriculum (GSWE2009) released today

HOBOKEN, N.J. — Stevens Institute of Technology's School of Systems and Enterprises announced today the release of [Graduate Software Engineering 2009 \(GSWE2009\): Curriculum Guidelines for Graduate Degree Programs in Software Engineering](#), a set of recommendations for a master's level graduate program in software engineering. Earlier versions of this work used the name "Graduate Software Engineering Reference Curriculum (GSWERC)."

These recommendations have come from a coalition formed in 2007 from academia, industry, government, and professional societies called the Integrated Software and Systems Engineering Curriculum (iSSEc) project, to create a reference curriculum that reflects current development practices and the greater role of software in today's systems. The US Department of Defense's (DoD) Office of the Secretary of Defense (OSD) is the principal iSSEc sponsor, motivated by the many challenges in acquiring, operating, and maintaining defense systems whose functionality and performance depend heavily on tractable and cost-effective software.

"This is the first major update to curriculum guidelines for graduate software engineering in 20 years," said Dr. Art Pyster, GSWE2009 Editor and Distinguished Research Professor at Stevens Institute of Technology, who led the project. "During that time software engineering has changed dramatically. We are confident that these guidelines are better aligned with industry, government, and university needs, and we plan to improve them continually as those needs change during the next 20 years."

The last time such a pivotal set of recommendations was released was in 1989, when the Software Engineering Institute (SEI) released curricular guidelines that were adopted in universities across the country. This time, iSSEc organized an international body of software engineering thought leaders to set a new standard for a 21st century Software Engineering curriculum. Software is a critical component in new products worldwide — often the critical component distinguishing products in the marketplace. Software enables technological advances that lead to new, high-performance products and systems in every commercial sector, including medical devices, automobiles, aircraft, power generation systems, mobile phones, and entertainment systems.

GSWE2009 pushes the envelope of software engineering skills by incorporating a previously lacking systems framework to ensure that software engineers are able to effectively design and maintain complex systems, including the relationships between hardware, software and human components. The curriculum is for a professional master's degree, analogous in many ways to a master's of business administration. GSWE2009 is envisioned as a living document that will be revisited regularly and updated when necessary to ensure relevance to the rapidly evolving software engineering discipline.

An international cross-section of universities and companies helped build the curriculum, which incorporates valuable feedback received from over 100 external reviewers. Professional society participation in the creation of GSWE2009 has been essential to ensuring maximum impact on global graduate education. The Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE) Computer Society have played a critical role in the creation of the guidelines. Additional support is being provided by the International Council on Systems Engineering (INCOSE), the U.S. National Defense Industrial Association (NDIA) Systems Engineering Division, and the Brazilian Computer Society (BCS).

Highlights include:

- A set of [outcomes](#) to be fulfilled by a student who successfully completes a graduate program based on the curriculum
- A set of [student skills, knowledge and experience](#) assumed by the curriculum, not intended as entrance requirements for a specific program, but the starting point for the curriculum's outcomes
- An [architectural framework](#) to support implementation of the curriculum
- A description of the fundamental or core skills, knowledge and experience to be taught in the curriculum to achieve the outcomes. This is termed a [core body of knowledge \(CBOK\)](#) and includes topic areas and the depth of understanding a student should achieve.

In addition to the curriculum itself, iSSEc is planning workshops to support implementation over the next couple of years. At the end of October, iSSEc will also publish two companion reports that will describe how current software engineering programs compare to the GSWE2009 guidelines, and how to solve some of the common problems encountered when starting or modifying a software engineering program. Please [click here](#) to join the mailing list if interested in participating in workshops, or learning more about this initiative.

About Stevens Institute of Technology

Founded in 1870, Stevens Institute of Technology is one of the leading technological universities in the world dedicated to learning and research. Through its broad-based curricula, nurturing of creative inventiveness, and cross disciplinary research, the Institute is at the forefront of global challenges in engineering, science, and technology management. Partnerships and collaboration between, and among, business, industry, government and other universities contribute to the enriched environment of the Institute. A new model for technology commercialization in academe, known as Technogenesis®, involves external partners in launching business enterprises to create broad opportunities and shared value.

Stevens offers baccalaureates, master's and doctoral degrees in engineering, science, computer science and management, in addition to a baccalaureate degree in the humanities and liberal arts, and in business and technology. The university has a total enrollment of 2,150 undergraduate and 3,500 graduate students, with about 250 full-time faculty. Stevens' graduate programs have attracted international participation from China, India, Southeast Asia, Europe and Latin America. Additional information may be obtained from its web page at www.stevens.edu.

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