

# **CCLI Phase 1: Curriculum for Accelerated Services Engineering (CASE)**

## **Project Summary**

The last ten years have been witness to a tectonic shift in the U.S. Information Technology (IT) industry in response to the shift towards services as the major driver of the U.S. economy, with the vast majority of IT professionals being employed in the technology-consuming industries – such as banking, insurance and health-care. For these industries IT is an enabler of their primary business, and as their services evolve in response to competition, so must their IT systems, in order to process and deliver the evolved information needed for these services to be delivered. However, computing education has not evolved rapidly enough to deliver the new skills needed of IT workers – skills in systems integration and evolution rather than system development, “services engineering” rather than the traditional “software engineering.”

The CETI interdisciplinary research group (now a NSF IUCRC Program affiliated with the Center for Experimental Research IUCRC at the Georgia Institute of Technology) at the Ohio State University has worked actively and collaboratively with industry for the last four years on complex industry problems. This activity has resulted in new knowledge – knowledge that is typically attained only after years of professional experience. We now seek NSF CCLI Phase 1 funding to leverage this vast amount of knowledge and knowledge assets to 1) organize this material into a curriculum that communicates both the problem context and the problem solving to undergraduates (that lack the prior experience), 2) create a four-course track in services engineering that can be incorporated in any undergraduate Computer Science program, and 3) establish a process of continuous improvement through community-building activities. As part of this track development, we will build a set of benchmark or reference enterprise applications that are representative of the complexity found in extant enterprise systems, and will serve as an exemplar enterprise system for the curricular material, as well as the core on which laboratory assignments for the above courses will be based. We will rigorously assess and validate this curriculum by offering these courses over the period of the project, and evaluating their effectiveness with a comprehensive set of internal assessment tools, and (uniquely) through direct external validation by also offering this material through an equivalent set of three short courses to industry professionals, and getting their feedback (and potentially of their peers and managers).

**Intellectual merit:** The principal investigators’ process of direct engagement with industry has resulted in knowledge creation relevant to the management of complex enterprise systems and services. This experiential knowledge combined with project assets will be organized and integrated into a curriculum teachable to undergraduates that move into the workforce. In addition to the curriculum creation itself, also unique is the two-fold assessment process. Because this curriculum is intended to make better practitioners, we plan to offer it (in addition to the classroom setting) directly to industry professionals, for their assessment and evaluation of the impact to their capabilities and their on-the-job performance.

**Broader impact:** Our immediate dissemination plan is to help incorporate this curriculum within 1) the undergraduate programs taught at our affiliated IUCRCs, and 2) within a local college targeting professional education. We believe that the curriculum development and validation proposed will be credible both within universities and industries and thus can immediately impact locally and nationally. Not only will our collaboration and community building in enterprise systems be leveraged to serve a large number of undergraduate and graduate students at The Ohio State University, but also the IT using multinationals like Nationwide and IBM, and local companies. Thus, once the consolidation is completed with the proposed effort, we believe that our program can scale to have national impact, potentially through CCLI Phase 2 and 3 efforts.