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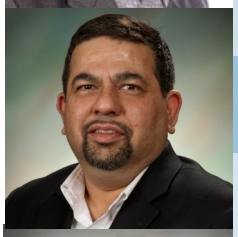

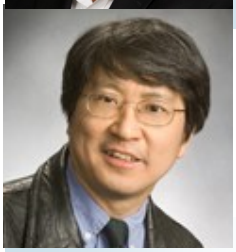

This newsletter presents the research conducted within the School of Engineering, Mathematics and Science (SEMS) at Robert Morris University (RMU). It covers various relevant topics including: interdisciplinary efforts, successful research grants, student research, posters and papers, journal publications, presentations at national and international conferences, contribution to professional societies, STEM educational research, industrial consulting collaborations and applied research.

Interdisciplinary collaboration between engineering, mathematics and science

SEMS Research Highlights

Improving Pedagogy in Software Engineering Education

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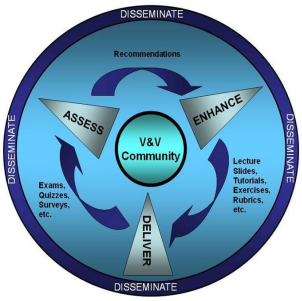

The graphic shows course enhancement plans and active learning tools created in this research to build software verification and validation community. This is a cycle of design, deliver and assess for continuous improvement.

Imparting real world experiences to the students in a software verification and validation (S/W V&V) course is a challenge due to lack of effective active learning tools. This pedagogical requirement is important as graduates are expected to develop software that meets rigorous quality standards in functional and application domains. Realizing the necessity of such teaching tools, the authors designed and developed twenty (20) delivery hours of case studies, eighteen (18) delivery hours of class exercises, and six (6) delivery hours of case study videos for use in courses that impart knowledge on S/W V&V topics viz. *requirements engineering, reviews, configuration management,* and *testing.* Four key skill areas sought after by employers, namely *communication skills, applied knowledge of methods, applied knowledge of tools, and research exposure* are used to drive the development funded by a National Science Foundation (NSF) grant and perfected through an industry-academia partnership.

The research work has successfully been completed by executing four project plans within the past three years. A ***course enhancement plan*** was used to drive activities related to reviewing, enhancing and modularizing domain topics identified by a gap analysis performed by focus group comprising of industry and academic partners. The ***course delivery plan*** was used to drive activities related to developing content delivery strategies. Several academic partners participated enthusiastically and delivered the active learning tools in their class rooms with a very positive student feedback. A ***course evaluation and assessment plan*** was used to drive activities related to periodically evaluating student learning and assessing program. Here fundamental pedagogical research work was conducted to correlate ABET outcomes assessment with Bloom's taxonomy as applied to STEM disciplines. Finally, a ***course dissemination plan*** was used to drive dissemination activities including two summer workshops and publication of several papers in refereed journals and presentations and posters at national and international conferences. The course modules have now been disseminated to 33 universities and 6 industries across the nation.

This is a publication of SEMS - Research and Outreach Center (ROC) which was established in 2010 by the SEMS Dean Dr. Maria Kalevitch. SEMS-ROC connects SEMS faculty and students with the region, the nation and the globe, demonstrates diversity and interdisciplinary interests of all three departments in the school. For more information on research at RMU – SEMS please contact:

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