Enterprise Systems Center (ESC)

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The Enterprise Systems Center (ESC) was formally established in 1995. This multidisciplinary center is committed to providing student experiential learning and leadership development primarily through industry projects which provide tangible value in the work products for the client companies. The ESC maintains a network of industry partner relationships to serve as a platform for Industrial and Systems Engineering (ISE) Department course opportunities, summer and co-op projects and leadership activities. Partnership and teaming on projects and programs is important and occurs primarily with the ISE Department as well as other departments, centers, and institutes.

The Center also seeks to advance interdisciplinary research and scholarship relating to systems optimization, analytics, information technology, new process development, and manufacturing. Additional research initiatives focus on discovering new methods for collaboration among academic, industry and government partners through the use of advanced technology. Emphasis is given to innovative systems approaches to problem-solving. The ESC is conveniently housed in Mohler Laboratory on Lehigh's Asa Packer Campus.

The Enterprise Systems Center provides undergraduate and graduate students with the opportunity to work with faculty and industry professionals to solve a variety of real world problems. All ISE Department seniors take the Capstone Project Course which often utilizes ESC company partnerships. The ESC's Graduate Student Project Initiative is focused on providing realistic and technologically challenging experiences as part of the educational process and preparation for full time employment, particularly for ISE Master's degree students. Participation by students from all four colleges on projects utilizing ESC's layered mentoring approach provides students with a level of work experience representative of what they will encounter following graduation. This is often a critical factor in acquiring highly competitive employment positions.

Since its inception, ESC has completed more than 1,300 projects with industry and government partners. Over 4,400 undergraduate and graduate students have benefited from experiential learning and leadership development through involvement with the Enterprise Systems Center.

RESEARCH ACTIVITIES

A central mission of the Enterprise Systems Center is to work in partnership with the Department of Industrial and Systems Engineering in both research and scholarship. The ESC conducts research into the development and implementation of enterprise strategies to improve the effectiveness of organizations. This research involves the utilization of systems thinking, information technology, and leadership approaches that add value to engineering education with eventual implementation in industry.

In its applied research efforts, the Center focuses on operational improvements, enterprise resource optimization, and product development or enhancement.

Operational improvement research with partner companies has included the development of decision support systems, processes for workflow analysis and facility reorganization, analysis of constraints and throughput improvement, evaluating sustainable manufacturing opportunities, agile business practices, utilization of analytics tools and the creation of new solutions for supply chain management.

Work in enterprise resource optimization has included methodologies for business process re-engineering relating to utilization of Generative AI tools, Machine learning, Supply Chain, Data Analytics as well as the analysis and selection of Enterprise Resource Planning (ERP) systems.

Applied research in product development or enhancement has included the use of computer modeling and simulation along with analysis and evaluation of existing products, design for manufacturability and robotic assembly support.

Involvement in these applied research activities with industry partners provides Lehigh students with hands-on learning experiences built on progressive responsibility and contribution to high impact company projects. From these activities, students gain leadership skills and valuable industry experience.

The Center also works to create technology-enabled educational techniques which augment traditional learning models. Coupled with knowledge management technology, these resources help to create integrated learning experiences and digital content to support engineering courses. The ultimate objective is to identify key components of innovative behavior and develop the in-person and online educational methods necessary to provide students with the skill-sets and experiences that will prepare them for leadership roles in society.

Within the ESC is the Learning Collaboratory, an innovative educational environment designed for use in support of both physical and virtual classroom models. For example, it enriches traditional educational techniques by utilizing online lectures, presentations and industry partner interactions originating from their physical facilities. The Collaboratory supports remote learning, development of an entrepreneurial mindset and the application of new technologies to augment traditional in-person educational experiences. When utilized as a combined in-person and remote configuration, the ESC Collaboratory helps to create a highly flexible learning platform.

EDUCATIONAL OPPORTUNITIES

The ESC provides support for Industrial and Systems Engineering courses in the analysis and design of industrial and service sector systems, computer and presentation graphics (CAD), industrial engineering techniques, analytics, experimental projects in industrial engineering, and leadership development. All of these courses are offered through the ISE Department. The ISE senior capstone project class utilizes ESC facilities, mentors, and online conferencing systems to step beyond the traditional classroom experience in project interactions, presentations and remote learning.

The ESC is continuously developing new programs as part of its Leadership Initiative. ESC has founded and is home to the engineering leadership minor. The leadership development course (ISE 382) was named as one of the top curriculum innovations by the Institute of Industrial and Systems Engineers. On multiple occasions, the Enterprise Systems Center has partnered with the ISE Department and has been recognized by organizations such as INFORMS for effective and innovative preparation of students for operations research practice as well as the strengthening of ties with academia and industry.

Participation in industry partner projects is open to all Lehigh students, both undergraduate and graduate, regardless of academic major, based on an interview process and specific project needs. On an ongoing basis, project opportunities for graduate and undergraduate students are often occurring.

For more information, contact Mythreyi Sekar (mys211@lehigh.edu), H. Robert Gustafson, Jr. (email: hrg2@lehigh.edu), or Dr. Emory W. Zimmers, Jr., Professor of Industrial and Systems Engineering, Lehigh University, and Director, Enterprise Systems Center, Mohler Lab, Second Floor, 200 West Packer Avenue, Bethlehem, PA 18015 (ewz0@lehigh.edu) or visit our website http://www.lehigh.edu/~inesc/