Engineering Program Learning Outcomes

The School of Engineering Accreditation System (SOEAS) is a database driven system intended to facilitate the collection of curriculum and assessment information within the School of Engineering (syllabus, learning outcomes, and students' surveys) to be used on accreditation processes (ABET and WASC). The system also helps the school academic support group in generating printed and electronic versions of syllabi for all Engineering classes and the distribution of these information to students, faculty, staff and general public by feeding in real time the School of Engineering websites as information becomes available.

The system is designed for ultimate use by the School of Engineering faculty and staff, with operational oversight and future design enhancements guided by the School of Engineering Curriculum Committee. The intent is for this system and its features to evolve to meet the ongoing needs of the School of Engineering academic community. The content of this system will provide evidence of data for use in developing the accreditation processes.

It is important to recognize that the SOEAS is a mechanism to ensure that faculty involvement in the accreditation process is maximized at all levels, from the determination of the program learning outcomes (PLOs), to the course learning outcomes (CLOs), all the way to important components of the assessment process. After the PLOs have been determined by the faculty of a particular program, all faculty submit data on the ways that their respective courses contribute to the PLOs. Each instructor also defines the CLOs for their own classes, and through the "Faculty Contributions to the Program Mission" forms, each faculty is also responsible for an important component of the assessment effort. The results of this assessment process are compiled instantly in graphic form, and all faculty have access to the results, and therefore can collaborate on the discussions for continuous improvement of the academic programs on campus.

Bioengineering

- Graduates will demonstrate an understanding of biology and physiology.
- Graduates will demonstrate the capability to apply advanced mathematics (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology.
- Graduates will demonstrate the ability to make measurements on, and interpret data from, living systems.
- Graduates will demonstrate the ability to address problems associated with the interaction between living and non-living materials and systems.
- Graduates will demonstrate professional and ethical responsibility.

Computer Science Engineering

- An ability to apply knowledge of computing and mathematics appropriate to the discipline;
- An ability to analyze a problem and identify the computing requirements appropriate for its solution;
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs;
- An ability to function effectively as a member of a team in order to accomplish a common goal;
- An understanding of professional, ethical, legal, security, and social issues and responsibilities;
- An ability to communicate effectively with a range of audiences;
- An ability to analyze the local and global impact of computing on individuals, organizations, and society;
- Recognition of the need for and an ability to engage in continuing professional development;
- An ability to use current techniques, skills, and tools necessary for computing practice;
- An ability to apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices;
- An ability to apply design and development principles in the construction of software systems of varying complexity.

Environmental Engineering

- EnvE graduates will have gained a strong foundation in basic mathematics, science, social science, humanities and arts, along with engineering principles, enabling active engagement as citizens in their communities.
- EnvE graduates will be adept at applying critical thinking, problem solving, engineering principles and reasoning, the scientific method, and teamwork to solve environmental resource problems and to restore and sustain the global environment.
- EnvE graduates will be prepared for advanced studies and research and/or employment advancement in a broad spectrum of industries and government agencies.
- EnvE graduates will communicate effectively in written, spoken, and visual formats with technical, professional, and broader communities.
- EnvE graduates will practice engineering according to the highest professional standards, demonstrating respect for social, ethical, cultural, environmental, economic, and regulatory concerns.
- EnvE graduates will be instilled with a desire to pursue life-long learning opportunities including continued education, professional licensure, challenging professional experiences and active participation in professional organizations

Mechanical Engineering

- An ability to apply knowledge of informatics, mathematics, science, and engineering;
- An ability to design and conduct experiments and numerical simulations, analyze, and interpret general scientific and engineering information;
- An ability to design a system, component, or process to meet desired needs;
- An ability to solve multidisciplinary problems;
- An ability to identify, formulate, and solve engineering problems;
- An understanding of professional and ethical responsibilities;
- An ability to communicate effectively;
- The broad education necessary to understand the impact of engineering solutions in a social context;
- A sound basis and motivation to engage in life-long learning and continuing education;
- A knowledge of contemporary issues;
- An ability to use the techniques, skills, and modern engineering and scientific tools necessary for engineering practice;
- A working knowledge of the principles of Mechanics and Thermodynamics and how these principles evolve into other disciplines such as Heat and Mass Transfer, Vibration and Control, Computational Engineering, Mechanical Design, etc.
- An ability to recognize new forms of thinking and new promising directions in engineering, and an understanding of modern tools of analysis, synthesis and design (such as neural networks, genetic algorithms, adaptive and bio-mimetic design, virtual environments, uncertainty in simulations, life-cycle analysis, etc.);
- An ability to incorporate interdisciplinary concepts from mathematics, physics, biology, chemistry and other disciplines into engineering solutions and vice-versa.
- A culminating design experience.

Materials Science Engineering

- Graduates will demonstrate the ability to apply advanced science (such as chemistry and physics) and engineering principles to materials systems.
- Graduates will demonstrate an integrated understanding of the scientific and engineering principles that underlie the four major elements of the field: structure, properties, processing, and performance related to materials systems appropriate to the field.
- Graduates will demonstrate the ability to apply and integrate knowledge from each of the above four elements of the field to solve materials selection and design problems.
- Graduates will demonstrate the ability to utilize experimental, statistical and computational methods in the context of materials systems.
- Graduates will demonstrate professional and ethical responsibility.