



Academic Learning Compact

Mechanical Engineering

Program Mission Statement

Academic programs in the UNF School of Engineering provide our students the maximum opportunity for leadership, innovation, and success in their careers and lives. We do this by: 1) providing a solid engineering education rooted in the fundamentals of the basic sciences, mathematics, and engineering sciences; 2) developing critical thinking abilities through real, hands-on challenges in industry and/or research; 3) giving context to the technical curriculum through a rigorous liberal arts education and a commitment to service learning; 4) conducting research programs that enhance the education of our students, the professional development of our faculty and staff, the technical needs of our industrial partners, and the well being of society; and 5) ensuring that all of our programs contribute significantly and measurably to the quality of life in Northeast Florida and beyond.

Student Learning Outcomes

Graduates will be able

Content/Discipline-Specific Knowledge/Skills

- an ability to apply knowledge of mathematics, science, and engineering
- an understanding of professional and ethical responsibility
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- a knowledge of contemporary issues
- Students should have an ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
- an ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations)
- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- an ability to communicate effectively with a range of audiences
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies
- an ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations)
- an ability to model, analyze, design, and realize physical systems, components or processes
- prepare students to work professionally in either thermal or mechanical systems while requiring topics in each area

Communication Skills

- an ability to function on multidisciplinary teams

- Ability to communicate effectively
- Students should have an ability to communicate effectively.

Critical Thinking Skills

- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to identify, formulate, and solve engineering problems
- Students should have an ability to model, analyze, design, and realize physical systems, components or processes
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Assessment Approaches

The School of Engineering (SoE) Faculty approved the current continuous improvement process (CIP) in AY 2006-07. Our CIP is principally focused on the extensive assessment requirements of the Engineering Accreditation Commission of ABET, Inc. - the body responsible for accrediting engineering programs in the United States.

The CIP revolves around two simple loops: one being on a strategic level and the other on a more tactical level. The strategic loop focuses on review and revision of the Program Educational Objectives, and since these are the foundations of the program they are reviewed on a three-year cycle. Program Educational Objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve (Criteria for Accrediting Engineering Programs, EAC-ABET, 2006). The strategic loop was executed in 2006-07 and all program constituents provided feedback that resulted in a new set of Program Educational Objectives considerably different from those in effect prior to and during 2006-07. These objectives are common to all undergraduate engineering programs and state that UNF School of Engineering academic programs produce graduates who 1) are able to solve significant engineering problems, 2) are skilled at conveying their ideas through written, oral, and visual communications, 3) are highly effective in multidisciplinary teams, 4) exhibit leadership skills in business, the profession and their communities, 5) are able to thrive in a dynamic global environment, and 6) know and uphold the ethical standards of the profession.

The tactical loop focuses on the review and revision of Program Outcomes and the curriculum, and occurs annually. Program Outcomes are statements that describe what students are expected to know and be able to do by the time of graduation (Criteria for Accrediting Engineering Programs, EAC-ABET, 2006). There are a total of 13 Program Outcomes for the Bachelor of Science in Mechanical Engineering (BSME) program. The Academic Learning Compact lists only the four most important outcomes associated with the following categories in the Academic Learning Compact: Communication Skills, Content Discipline Knowledge/Skills, and Critical Thinking Skills.

Both CIP loops use evaluation/assessment data collected from and provided by the primary program constituencies. The primary program constituencies are students, employers, and alumni. The CIP evaluation/assessment instruments include the following: a) a graduating senior survey, b) student forums, c) regional and national competition results, d) Fundamentals of Engineering (FE) exam results, e) job placement data, f) an employer survey, g) a Co-operative Education employer survey, h) employer focus groups, i) an alumni survey for those 1-2 years from graduation, and j) an alumni survey for those 3-5 years from graduation. There was a new emphasis on direct outcomes assessment in 2008-09; including the FE Exam results, student competitions, and a new set of rubrics for evaluating the capstone senior design projects. (Please note that not all assessment tools are pertinent to each outcome.) The School of Engineering Director, assisted by the CIP Data Manager (typically, a graduate assistant), has the task of assimilating the data resulting from these instruments for use by the Mechanical Engineering (ME) Faculty. The ME Faculty is charged with reviewing the data and developing program

improvements in response to issues identified by the data. Playing nearly as important a role is the School of Engineering Advisory Council (SoEAC) - a group of representatives from industry that advises the BSME program on curricula, resources, and other issues pertinent to the health and growth of the BSME program. The SoEAC reviews and comments on the ME Faculty's recommendations. The ME Faculty is charged with implementing the recommended changes and improvements in the subsequent academic year.