

Mechanical Engineering Technology Mechanical Design Concentration

Program Mission Statement

The mission of the Mechanical Design Concentration in the Mechanical Engineering Technology program is to provide students with a quality education that will prepare them to pursue careers as engineering technicians in the design of commercial products, tooling, machinery and production process systems. The major areas of study include computer-aided-design (CAD), engineering materials, electro-mechanical devices, air conditioning, machine design, and fluid systems; furthermore, the Design Concentration emphasizes the generation, transmission, and utilization of mechanical energy for commercial application in high-tech industry. Graduates may work in a variety of industrial and professional settings, typically in areas that utilize CAD systems for design work. Career paths include environmental control, machine and process design, product and systems development, quality assurance, plant maintenance engineering, and technical sales.

TAC/ABET Engineering Technology Criteria

Program Educational Objectives and Program Outcomes must support TAC/ABET Engineering Technology criteria a-k:

- (a) an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines,
- (b) an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology,
- (c) an ability to conduct, analyze, and interpret experiments and apply experimental results to improve processes,
- (d) an ability to apply creativity in the design of systems, components or processes appropriate to program objectives,
- (e) an ability to function effectively on teams,
- (f) an ability to identify, analyze, and solve technical problems,
- (g) an ability to communicate effectively,
- (h) a recognition of the need for, and an ability to engage in lifelong learning,
- (i) an ability to understand professional, ethical, and social responsibilities,
- (j) a respect for diversity and knowledge of contemporary professional, societal, and global issues,
- and
- (k) a commitment to quality, timeliness, and continuous improvement.

Also, the Program Educational Objectives and Program Outcomes must support TAC/ABET Mechanical Engineering Technology criteria a, b and c:

- (a) Technical expertise in a minimum of three subject areas chosen from – engineering materials, applied mechanics, applied fluid sciences, applied thermal sciences and fundamental electricity

(b) Technical expertise in manufacturing processes, mechanical design and computer-aided engineering graphics with added technical depth in at least one of these areas.

(c) Expertise in applied physics having an emphasis in applied mechanics plus inorganic chemistry, or, if program objectives do not require chemistry, added technical topics in physics appropriate to the program objectives.

Program Educational Objectives

Program Educational Objectives are based on student achievement 2-3 years after graduation. The Program Educational Objectives are:

- EO-1 To ensure graduates have the ability to communicate effectively.
- EO-2 To ensure graduates have a working knowledge in the areas of computer-aided-design (CAD), engineering materials, electro-mechanical devices, air conditioning, machine design, and fluid systems.
- EO-3 To prepare graduates to obtain employment in the mechanical engineering-related areas of commercial products, tooling, machinery and production process systems.

Program Outcomes

The **Mechanical Engineering Technology – Mechanical Design Concentration** student will have demonstrated the following attributes upon graduation:

- **PO-1** Communicate effectively through proper use of oral, written and graphic skills. Covers ABET criteria: a, c, f & g
- **PO-2** Knowledge of basic machining processes, metrology, and GD&T for mechanical design. Covers ABET criteria: a, b & g and specific TAC/ABET Mechanical Engineering Technology criteria: A (materials) & B (manufacturing processes).
- **PO-3** Knowledge of the properties of various engineering materials used in industry. Covers ABET criteria: a, c & k and specific TAC/ABET Mechanical Engineering Technology criteria: A (materials).
- **PO-4** The ability to use Computer-Aided Design (CAD) software to create 2D mechanical drawings. Covers ABET criteria: a, b & g and TAC/ABET Mechanical Engineering Technology criteria: B (CAE graphics)

- **PO-5** The ability to apply the concepts of fluid mechanics to analyze and design fluid systems. Covers ABET criteria: a, b, c, d & f and TAC/ABET Mechanical Engineering Technology criteria: A (fluid sciences) & B (mechanical design).
- **PO-6** The ability to apply the concepts of air conditioning to analyze and design HVAC systems. Covers ABET criteria: a, b, d, f & k and TAC/ABET Mechanical Engineering Technology criteria: A (thermal sciences, B (mechanical design) & C (physics).
- **PO-7** The ability to apply the concepts of machine design to select components as well as analyze and design mechanical systems. Covers ABET criteria: a, b, d, f & k and TAC/ABET Mechanical Engineering Technology criteria: A (applied mechanics), B (mechanical design) & C (physics).
- **PO-8** Knowledge of basic electrical circuits and electro-mechanical devices. Covers ABET criteria: a, b & f and TAC/ABET Mechanical Engineering Technology criteria: A (fundamental electricity) & C (physics).
- **PO-9** Solve technical problems using algebra and trigonometry. Covers ABET criteria: a, b & f
- **PO-10** Understand the importance of teamwork, lifelong learning, professional, ethical and social responsibility, respect for diversity, and commitment to quality, timeliness and continuous improvement. Covers ABET criteria: e, g, h, i, j & k.