

# *Mechanical Engineering Technology - CPS (MET)*

## **MET 1990. Elective. (1-4 Hours)**

Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

## **MET 2000. Engineering Computer-Aided Design and Tolerance Analysis. (3 Hours)**

Covers design topics relative to the creation, modification, analysis, and optimization of engineering components and assemblies with extensive use of selected computer-aided design software (CAD). Concentrates on the use of contemporary parametric and/or explicit CAD modeling, management of associative relationships between geometries, and digital prototyping. Studies the role of CAD in product development and product life-cycle management. Involves extensive hands-on practice using commands and featured capabilities of the selected CAD software and completion of individual or team design projects. Projects focus primarily on mechanical systems design. Emphasizes accurate dimensioning, symbol interpretation, and accurate tolerancing of digital designs. Also includes introductory topics of graphical analysis of mechanical stress of elements and assemblies.

**Prerequisite(s):** GET 1150 with a minimum grade of D-

## **MET 2040. Engineering Manufacturing Process. (3 Hours)**

Introduces learners to engineering materials, property enhancement technologies, metrology, assembly operations, and rapid prototyping. Discusses a variety of methods for improving bulk and surface properties based on materials compositions, structures, and desired performance. These include heat treatment, plasma surface engineering, and other vacuum technologies. Introduces industrial robotics, numeric control, and programmable logic controllers. Studies and discusses production systems, process planning and quality control, and production inspection based on various industrial applications.

## **MET 2100. Mechanics 1: Statics. (3 Hours)**

Introduces the fundamental concepts and principles needed to analyze the mechanical equilibrium of engineering systems. Topics include Newton's fundamental laws, systems of units, vector operations, forces, mechanical equilibrium of particles and rigid bodies, moments of forces, moments of couples, free-body diagrams, 2D and 3D equilibrium of bodies, centers of gravity, centroids, concentrated and distributed loads, analysis of mechanical structures, dry friction, moments of areas and inertia, and an introduction to the concepts and definitions of mechanical work and potential energy.

**Prerequisite(s):** (MTH 2105 with a minimum grade of D- or MTH 2120 with a minimum grade of D- ); PHY 1200 with a minimum grade of D-

## **MET 2200. Mechanics 2: Dynamics. (3 Hours)**

Expands and uses the underlying principles and concepts of Newtonian mechanics to study, analyze, and solve problems relative to mechanical systems in motion. Explores approaches to analyze motion both neglecting and considering the cause of motion and their relationship to the design of engineering systems. Discusses subjects pertaining to the study of kinematics and dynamics of particles and rigid bodies in detail. Topics include linear, curvilinear, and rotational motion of particles and rigid bodies, as well as conservation principles and concepts and inherent definitions for the analysis and design of dynamic systems such as velocity, acceleration, linear and angular momentum, impulse, forces, work, kinetic and potential energy, total mechanical energy, and power.

**Prerequisite(s):** MET 2100 with a minimum grade of D-

## **MET 2990. Elective. (1-4 Hours)**

Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

## **MET 3300. Engineering Materials Science. (3 Hours)**

Studies the foundation of physical and chemical characteristics, properties, behavior, and selection. Discusses the influence of fabrication and treatment methods on the characteristics of typical materials used in engineering applications including metals, ceramics, polymers, and composites. Topics include crystalline and noncrystalline structures, lattices, point defects, and dislocations. Also covers mechanical, thermophysical, and electrochemical characteristics of materials such as hardness, mass diffusion, and electroplating, as well as ferrous and nonferrous metal alloys, the structure and properties of ceramics, fundamentals of polymer science and technology, and synthetic and laminar composites.

## **MET 3990. Elective. (1-4 Hours)**

Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

**MET 4100. Mechanical Engineering Systems Design. (3 Hours)**

Covers the fundamental principles of mechanical design including details of the engineering design process, design factors, creativity, optimization, safety, and value engineering. Discusses properties and selection of common engineering materials used in design and manufacturing of mechanical components and machines. Focuses on analysis and design of typical machine elements that operate under mechanical loads and stresses, including shafts, gears, bearings, belt and chain drives, clutches, brakes, fasteners, springs, torsion bars, power screws, linear actuators, and joints. Integrates computer usage for efficient and rapid design, formulae evaluation, mathematical simulation, design selection and optimization, and virtual prototyping. Discusses additional elements of engineering design such as cost analysis, robustness, quality improvement, and environmental concerns.

**Prerequisite(s):** MET 2000 with a minimum grade of D- ; MET 3300 with a minimum grade of D-

**MET 4950. Seminar. (1-4 Hours)**

Offers an in-depth study of selected topics.

**MET 4955. Project. (1-4 Hours)**

Focuses on in-depth project in which a student conducts research or produces a product related to the student's major field. May be repeated without limit.

**MET 4983. Topics. (1-4 Hours)**

Covers special topics in mechanical engineering technology. May be repeated without limit.

**MET 4990. Elective. (1-4 Hours)**

Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

**MET 4991. Research. (1-4 Hours)**

Offers students an opportunity to conduct research under faculty supervision.

**Attribute(s):** NUpath Integration Experience

**MET 4992. Directed Study. (1-4 Hours)**

Offers independent work under the direction of members of the department on a chosen topic.

**MET 4994. Internship. (1-4 Hours)**

Provides students with an opportunity for internship work.

**Attribute(s):** NUpath Integration Experience

**MET 4995. Practicum. (1-4 Hours)**

Provides eligible students with an opportunity for practical experience.

**MET 4996. Experiential Education Directed Study. (1-4 Hours)**

Draws upon the student's approved experiential activity and integrates it with study in the academic major.

**Attribute(s):** NUpath Integration Experience