# MECHANICAL MAINTENANCE TECHNOLOGY (MMAT)

**MMAT 101. Introduction to Industrial Operations**
Credits: 2
Typically Offered: FALL
Covers the basic steam generation and gas conversion systems, how thermal energy is converted into electrical energy, components of the system, and design features for gaining thermal efficiency. Includes handling of water, fuel, and wastes, and the operating features of an industrial plant.

**MMAT 103. Safety and Health**
Credits: 2
Typically Offered: FALL
This course covers all aspects of maintaining a safe work environment; including OSHA/Regulatory Compliance and Laboratory Safety. This course meets the needs of industrial safety, health, and regulatory training.

**MMAT 105. Hand and Portable Tools**
Credits: 2
Typically Offered: FALL
This course covers the most important hand tools used on the job. Examines the various kinds of wrenches and screwdrivers, their uses and handling techniques, pipefitting tools, plumbing tools, electrician's tools, sheet metal working tools, machinists' metal-working tools. Explains the uses, selection, safety and care of industrial power tools: Electric drills, electric hammers, pneumatic drills and hammers, screwdrivers, nut runners, wrenches, linear-motion and circular saws, routers and planes, electric sanders, grinders, and shears. Covers tool sharpening techniques for selected tools.

**MMAT 107. Basic Mechanics**
Credits: 2
Typically Offered: FALL
This course covers force and motion, work and energy and fluid mechanics as applied in industrial maintenance. Explains principles of operation for simple machines, such as the lever, inclined plane, wheel and axle, pulley, and screw. Explains the basic elements of industrial machines, as well as common measurement tools used to monitor and adjust equipment.

**MMAT 109. Measurements**
Credits: 2
Typically Offered: FALL
This course covers units of measurement used in commercial and industrial applications. Examines all aspects of basic measurement concepts and procedures, including accuracy and tolerance. Covers techniques and devices for comparison measurements (dial indicators and gauge blocks).

**MMAT 111. Schematics, Symbols and Blueprints**
Credits: 2
Typically Offered: FALL
Covers all types of schematics and symbols used in commercial and industrial settings. Examines symbols on schematics, electrical symbols and diagrams, piping symbols and diagrams, hydraulic and pneumatic diagrams and symbols. Studies and explanations of electrical/electronic control schematics. Covers welding and joining symbols.

**MMAT 113. Industrial Rigging**
Credits: 1
Typically Offered: FALL
This course covers techniques and safeguards in the use of rope, chain, hoists, and scaffolding when moving heavy plant equipment and maintaining plant utilities.

**MMAT 115. Lubrication, Bearings, and Seals**
Credits: 2
Typically Offered: FALL
Covers a complete lubrication training program, including functions and characteristics of lubricants, factors in selection of lubricants, and effects of additives. Oils, greases, and other compounds used for lubrication are described, as well as their applications. Covers plain bearings, their parts, dimensions, functions, and relining techniques. Continues with installation and replacement of antifriction bearings. Also covers linear motion bearings and shaft seals.

**MMAT 117. Material Handling Systems**
Credits: 1
Typically Offered: FALL
Covers belt conveyors that carry coal, sand, gravel, grain and other loose materials. Acquaints the student with the terminology, basic structure, and operation of material handling systems. Includes detailed coverage of belts, belt cleaners, idlers, and feed/discharge devices, as well as an explanation of how to install, maintain, replace, and troubleshoot these components.

**MMAT 119. Troubleshooting Skills**
Credits: 1
Typically Offered: FALL
Explores the subject of troubleshooting and the importance of proper maintenance procedures. Covers working with others, aids in communication, and trade responsibilities. Outlines troubleshooting techniques and aids, using schematics and symbols. Focuses on specific maintenance tasks, breakdown maintenance, and planned maintenance.

**MMAT 150. Mechanical and Fluid Drive Systems**
Credits: 2
Typically Offered: SPRING
Covers belt drives, chain drives, gears and gear drives, adjustable-speed drives, shaft alignment, shaft coupling devices, and clutches and brakes.

**MMAT 155. Hydraulics and Pneumatics**
Credits: 3
Typically Offered: SPRING
Covers hydraulic and pneumatic principles, types of hydraulic fluids and their characteristics. Describes components of hydraulic and pneumatic systems and their functions, including filters and strainers, reservoirs and accumulators, pumps, piping, tubing and hoses, control valves, relief valves and actuating devices.

**MMAT 160. Valves and Steam Traps**
Credits: 3
Typically Offered: SPRING
Covers maintenance and operation of gate, globe, ball, plug, check, special-purpose valves and steam traps. Details actuators and various acccessories. Explains valve selection based on application. Explores methods of protecting piping systems.

**MMAT 162. Piping, Tubing Systems and Pipefitting**
Credits: 2
Typically Offered: SPRING
Covers tubing specifications, materials, and fittings. Explores procedures used for handling, bending, cutting and installing tubing. Gives basics of tubing in a hydraulic system. Covers hose systems, gaskets, sealant, and adhesives. Covers piping and tubing systems used for fluid transport in the plant: Hydraulic fluids, steam, liquefied product, refrigerant, and water. Explores typical metallic and nonmetallic piping systems, pipe-joining methods, and how tubing and hoses differ from piping, valves, pipe fittings, hangers, supports and insulation and covers how tubing is sized, fitted, bent and joined. Studies uses of traps, filters, and strainers.

**MMAT 170. Equipment Installation**
Credits: 2
Typically Offered: SPRING
Covers installation procedures for large plant equipment. Considers factors affecting proper installation in detail, from preparatory relocation of underground piping and wiring, through equipment anchoring, aligning and test running.

**MMAT 175. Pumps, Compresssors and Turbines**
Credits: 5
Typically Offered: SPRING
Covers typical applications of various types of pumps, compressors and turbines. Explores factors affecting equipment selection. Defines operating principles of centrifugal, propeller, and turbine, rotary, reciprocating, and metering equipment. Includes special-purpose pumps, diaphragm pumps, and others designed to handle corrosive and abrasive substances.

**MMAT 180. Metals & Nonmetals in the Plant**
Credits: 2
Typically Offered: SPRING
Introduces metals, metallurgy, and metalworking. Covers the properties of metals, including their mechanical properties. Examines several industrial manufacturing processes. Covers iron and standard steels. Studies the different kinds of heat treatment and their usage. Introduces techniques of working with copper, aluminum, magnesium, titanium, lead, nickel, tin and zinc. Introduces major nonmetal materials and how they are most frequently used. Illustrates properties, characteristics, and classifications of each material. Covers synthetic and natural materials. Examines various paints and coatings, their proper use, preparation, and application. Surveys industrial chemicals. Chemical safety precautions are covered, along with the proper use of protective equipment.

**MMAT 205. Basic Electricity and Electronics**
Credits: 3
Typically Offered: FALL
Covers basic, nonmathematical approach to understanding principles of electricity. Introduces electron theory, static electricity, electrons in motion, and magnetism. Covers basic methods of measuring current, voltage, and resistance. Explains circuit components-conductors, insulators, resistors, capacitors-and simple Ohm's Law calculations for DC and AC circuits.