Mechatronics Technology Course Descriptions

Course Name: Print Reading for Industry
Course Code: BPR 101
Course Description: This course introduces the basic principles of blueprint reading. Topics include line types, orthographic projections, dimensioning methods, and notes. Upon completion, students should be able to interpret basic blueprints and visualize the features of a part. Prerequisites: None

Course Name: Industrial Math
Course Code: MAT 101
Course Description: This course is designed to introduce students to the mathematics utilized daily on the manufacturing/tool and die shop floor. Students will utilize blueprints, machining processes and measurement data to calculate answers in Basic Math, shop Algebra, and basic plane Geometry. Prerequisites: None

Course Name: Inspection Principles
Course Code: QCT 105
Course Description: This course introduces individuals to the necessary elements required to be effective in the use of precision gaging equipment utilized in the manufacturing industry. Instruction is geared toward dimensional inspection techniques. Prerequisites: None

Course Name: Machine Technology
Course Code: MCH 100
Course Description: This is an introductory course designed to teach the fundamental skills used in the set up and operation of the engine lathe, milling machine, and surface grinder. Safety, cutting tool use and theory, selection of cutting speeds and feeds, and applied measurement techniques will also be included. Prerequisites: Print Reading for Industry, Industrial Math, Inspection Principles

Course Name: Basic Computer Operation
Course Code: BCS 102
Course Description: This course covers fundamental functions and operations of the computer. Topics include identification of components, overview of operating systems, and other basic computer operations. Upon completion, students should be able to operate computers, access files, print documents, and perform basic applications. Prerequisites: None

Course Name: Industrial Safety
Course Code: MET 100
Course Description: This course introduces the principles of industrial safety. Emphasis is placed on industrial safety, OSHA, NEC, and environmental regulations. Upon completion, students should be able to demonstrate knowledge of a safe working environment and OSHA compliance. A fundamental study of accident costs and causes, safety records, accident investigation, development of safeguards, job safety analysis, facility inspection, and safety communication will be covered. Prerequisites: None
Course Name: Fundamentals of Electricity  
Course Code: MET 101  
Course Description: This course is designed to acquaint the student with the theory and practice of using electricity as it applies to industrial technology. The topics covered include atomic theory, electrostatic charges, basic concepts of electric circuits, Ohm’s Law, Kirchhoff’s law, series, parallel and hybrid circuits, component symbols, measuring instruments and transformer theory, magnetism, motors, generators, relays, and magnetically operated devices. Circuit analysis and calculations of electrical quantities will also be taught and performed.  
Prerequisites: Industrial Math

Course Name: Control Wiring  
Course Code: MET 103  
Course Description: This course is designed to provide instruction in all phases of the electrical field from basic wiring through motion control, instrumentation, and automation. Circuit logic will be discussed as well as motor control. Students will also be instructed on electrical quantity measuring equipment.  
Prerequisites: Industrial Safety, Fundamentals of Electricity

Course Name: AC/DC Applications  
Course Code: MET 105  
Course Description: This course is designed to introduce concepts of electricity involving the behavior of both direct and alternating current circuits. Industrial motor control fundamentals are covered, as well as the basic theory of magnetic controls, control components, pilot devices, control circuit diagrams, and troubleshooting. This course begins with magnetism and electromagnetic theory followed by the principles of operation of series, shunt and compound direct current generators and motors, manual motor starters and applications of acceleration, braking, reversing of motors used in rotating machinery.  
Prerequisites: Fundamentals of Electricity, Industrial Safety

Course Name: Basic Maintenance Welding  
Course Code: WLD 108  
Course Description: This course is an introduction to the fundamentals of welding practices that will emphasize the safety precautions and requirements to be utilized when performing welding tasks. Participants will learn to explain the fundamentals of welding, demonstrate various welding techniques, execute proper shop and equipment safety, and make effective, longer-lasting welds.  
Prerequisites: Industrial Math, Print Reading for Industry

Course Name: Mechanical Drive Systems  
Course Code: MET 107  
Course Description: This course introduces the basic principles of mechanical systems, component operation, system design, component installation and adjustment, troubleshooting, maintenance, and applications. Components include fractional horsepower and heavy-duty style components, 3 types of bushings, 7 types of couplings, single and multiple belt drives, single and multiple chain drives, silent chains, synchronous and HTD belt drives, spur gear drives, manual lubrication, plain bearings, roller bearings, seals, and gearboxes. Students will learn how to perform shaft alignment using various techniques.  
Prerequisites: Industrial Math, Print Reading for Industry

Course Name: Fluid Power Technology  
Course Code: MET 108  
Course Description: This course will cover the basic principles of fluid science, component operation, circuit design, and applications. Hydraulic components include fixed pumps, cylinders, motors, flow control valves, pressure-compensated flow control valves, pressure control valves, gages, flow meters, directional control valves, check valves, and accumulators. Pneumatic components include cylinders, motors, flow control valves, pressure regulators, gages, flow meters, check valves, and directional control valves.  
Prerequisites: Industrial Math, Print Reading for Industry
Course Name: Basic CNC Operation
Course Code: CNC 100
Course Description: This course introduces the concepts and capabilities of computer numerical control machine tools. Topics include setup, operation, and basic applications. Upon completion, students should be able to enter programs into memory, perform safe machine set up and operation, and input machine data into the control.
Prerequisites: Machine Technology

Course Name: Robot Operation & Programming
Course Code: MET 150
Course Description: This course is geared to the first time operator, programmer, or individual who will operate Fanuc robots. Emphasis will be placed on safety and the fundamentals of operating and programming a robot. Students will utilize the robot and peripheral devices to simulate industry applications.
Prerequisites: None

Course Name: Programmable Logic Controllers (PLCs)
Course Code: MET 160
Course Description: This course covers industrial programmable controllers and program writing including; but not limited to, basic relay logic programming, program control instructions, sequence instructions, data manipulation, math instructions, program editing and troubleshooting.
Prerequisites: Control Wiring

Course Name: Electromechanical Robot Maintenance
Course Code: MET 170
Course Description: This course will provide instruction on electrical and mechanical maintenance principles for industrial robots. Students will learn to safely power up the robot from complete shutdown, manipulate the robot using the teach pendant, recognize and describe major robot components, diagnose robot mechanical problems to the component level, replace all mechanical components on the robot, perform adjustments on the robot, and conduct periodic maintenance on the mechanical unit.
Prerequisites: Control Wiring

Course Name: Applied Software for Mechatronics
Course Code: MET 180
Course Description: This class is designed to integrate the student’s knowledge of hydraulic, pneumatic, mechanical, and electrical system applications. Using the Automation Studio software package, the course will use simulation exercises to explain equipment and control operations and examine interactions between the various systems.
Prerequisites: Basic Computer Operations, Control Wiring, Fluid Power Technology, Programmable Logic Controllers (PLCs)

Course Name: Preventative Maintenance Applications
Course Code: MET 190
Course Description: This course introduces the theory of maintenance and the skills necessary to maintain equipment used in industrial facilities. Topics include maintenance theory, predictive and preventive maintenance, electrical/mechanical equipment operation and maintenance, and maintenance documentation. Upon completion, students should be able to perform maintenance on electrical/mechanical equipment in industrial facilities.
Prerequisites: Control Wiring, Fluid Power Technology, Mechanical Drives Systems
Course Name: Automation Applications
Course Code: MET 200
Course Description: This course offers an introduction to motion control, including servo motors, DC servo drivers with control circuits, alternating current (AC) motors, steppers, actuators, sensors, fundamentals of basic control principles, and industrial and engineering applications of motion control systems.

Prerequisites: Programmable Logic Controllers (PLCs)