MESA COMMUNITY COLLEGE
A MARICOPA COMMUNITY COLLEGE

Automation Technology & Robotics Courses

ATP 100 Introduction to Manufacturing & Programmable Logic Controllers

Description: Explores the origin and basic operation of programmable logic controllers (PLC) in manufacturing processes. Laboratory exercises include ladder logic programming, installation, adjustment, and testing of digital and analog sensors, signal conditioners, and basic troubleshooting concepts. **Prerequisites**: None.

ATP 106 Industrial Electrical Systems

Description: Safety for electrical power and control systems, DC and AC circuit analysis, DC power supplies, switches and proximity sensors, inductors and capacitors, electrical and engineering documentation and schematics, digital multimeter and oscilloscope operation, solid state relays, and industrial control transformers. **Prerequisites**: None.

ATP 111Mechanical Systems & Maintenance

Description: Examination of mechanical drive systems. Includes fundamentals of direct drives, belt and pulley drives, chain drives and gear drives. Explores calculating and measuring quantities such as power, speed, torque, speed and torque reduction/amplification, and backlash. Also includes hands-on experience assembling and aligning components, testing and troubleshooting systems. **Prerequisites**: None.

ATP 115Fluid Power

Description: Fundamental industrial fluid power concepts including hydraulic and pneumatic installation, maintenance, and adjustments for the control of automated manufacturing systems. **Prerequisites**: None.

ATP 201 Programmable Logic Controller (PLC) Systems

Description: Advanced lecture and laboratory course builds upon the foundations covered in introductory course, including development and documentation of advanced ladder logic and function block programming, Programmable Logic Controller (PLC) control of variable frequency devices, PLC Networks and the installation and programming of Human Machine Interfaces (HMI). **Prerequisites**: A grade of C or better in (ATP100 and ATP106) or permission of Instructor.

ATP 205Electric Motors & Controls

Description: Examination of electrical motor control, power, and protection systems. Includes fundamentals of single and three-phase power, power, control and protection circuits. Also includes variable frequency drive (VFD), silicon controlled rectifier (SCR) control, and programmable logic controller (PLC). **Prerequisites**: A grade of C or better in (ATP100 and ATP106) or permission of Instructor.

ATP 210Process Control

Description: Introduction to instrumentation and control systems for wet type (continuous product) and dry type (discrete product) production systems. Includes process control concepts, instrumentation tag information, piping and instrumentation diagrams, level and flow sensing devices, Proportional-Integral-Derivative (PID) controllers, Programmable Logic Controllers (PLC), and final control elements. **Prerequisites**: A grade of C or better in (ATP100 and ATP106) or permission of Instructor.

APT 123Electrical Wiring J-STD Soldering Certification

Description: This course is an industrial certification for the full J-STD soldering certification, covering the soldering of wires, terminals, plated through hole (PTH), and surface mount technology (SMT), as well as cleanliness,

inspection and the aerospace regulations addendum. Certification is verified by a certified IPC instructor. **Prerequisites**: Permission of Instructor.

ATP 215Automation Systems Integration

Description: Capstone course regarding the implementation of the planning, construction, adjustment, and testing of an industrial control system needed for the development of a functional automated system. **Prerequisites**: A grade of C or better in (ATP201, ATP205, and ATP210) or permission of Instructor.

ATP 225Robotics Operations & Programming

Description: This course is intended for an operator, technician, or programmer who must setup, record and/or troubleshoot programs on a Handling Tool software package. The course covers the Robot Operations intermixed with the tasks required to set up the Handling Tool application, test run, and refine the program and production setup. **Prerequisites**: A grade of C or better in (ATP190, ATP201, and ATP205) or permission of Instructor.

BIO 107 Introduction to Biotechnology

Description: Introduction to biotechnology and its global impact on society. Covers applications, laboratory techniques, limitations and the international economic benefits, risks, and legal and moral issues associated with biotechnology. **Prerequisites**: None.

DFT 2553D Printing/Additive Manufacturing

Description: Rapidly advancing additive manufacturing (AM) technologies, often called 3D printing, provide us a direct way of converting digital data into physical objects. Additive manufacturing enables the building of customized parts previously impossible to fabricate. Design for additive manufacturing teaches background, terminology, fundamentals designing for additive manufacturing, and current AM technology as well as advantages and limitations of 3D printing, materials, and post-processing. Students will learn and apply technique through lab activities, machine operation and maintenance, part design and analysis, adapting stereolithography files, printing models, and post-processing. **Prerequisites**: A grade of C or better in DFT254AA, or MFG254, or permission of Department or Division.

MET 292AE Solid Design 3D Printing: Techniques in Additive Manufacturing

Description: Assembly modeling of mechanical design. Use of top-down and bottom-up technique for product development. Creation of engineering drawings for parts and assemblies using associative mechanical design software. Motion study and fitment analysis of assembly model applying techniques of additive manufacturing. Application of kinematics; linear and rotary motors, springs gravity and contact mechanisms to validate 3D print Model. 3D printing using various additive manufacturing materials including Acrylonitrile Butadiene Styrene (ABS), Polylactic Acid (PLA) and Nylon. **Prerequisites**: A grade of C or better in MET113 and MET288AE, or permission of Instructor.

GTC 106 Industrial Safety

Description: Safety, health management, and accident prevention in industrial work environment. Role of Occupational Safety and Health Administration (OSHA) act, materials handling, electrical safety, machine safety, first response to fire and medical emergencies, safety signs and color codes, recognition of safety and health hazards accident prevention, management responsibilities, and OSHA 10 certification. **Prerequisites**: None.