Workforce & Continuing Education
MACOMB COMMUNITY COLLEGE
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M-TEC
Michigan Technical Education Center℠

Robot Technician Certificate

The Robotics Technician program builds on the Robot Programmer pathway to include an introduction to Programmable Logic Controllers (PLCs) used for machine communication. Electrical fundamentals, Robot Electrical Troubleshooting and Motor Drives and Control are also included in this pathway. The Robotics Technician is prepared to enter the complex environment of today's automated processes with a comprehensive approach to installation, programming and troubleshooting. Upon successful completion, a FANUC Handling Tool Operation and Programming certification and a FANUC iRVision 2D Certification will be issued.

Please note: The Manufacturing Essentials Program is a pre-requisite to entering this program. This pre-req may be waived based on experience or successful completion of a hands-on assessment in these areas. Assessment to be completed at the expense of the student.

Non-Credit Course Code	Course Title	Hours	Days
CELC 8013	Electrical Fundamentals	40	5
CELC 8012	Motor Controls & Drives	40	5
CMNF 8241	FANUC Robotics Operations	40	5
CELC 8022	Electronic Sensors	24	3
CMNF 8283	HandlingPRO (ROBOGUIDE) Workcell Simulation	16	2
CMNF 8270	Advanced Robotics Operations	40	5
CMNF 8090	Robotics Electrical Troubleshooting and Maintenance	40	5
CMNF 8273	FANUC iRVision 2D	24	3
CMNF 8293	Machining Essentials	24	3
CMNF 8269	Fluid Power Fundamentals	40	5
CMNF 8242	Robotics Mechanical	40	5
CMNF 8247	Basic PLC	40	5
A certificate of completion will be awarded to students who successfully complete the above courses.		408 hours	51 days

Non-Credit Course Descriptions

Electrical Fundamentals – CELC 8013 – 40 hours

Prerequisite: None

This forty (40) hour training course covers the basics of AC (Alternating Current) and DC (Direct Current) theory and fundamentals. The student will first gain an understanding of the concepts of electrical schematics, components, voltage, current and resistance. These fundamentals will then be applied through Ohm's Law to basic circuit design and analysis. Power, magnetism and DC generation will also be introduced to complete the theories of DC applications.

Motor Controls & Drives – CELC 8012 – 40 hours

Prerequisite: CELC 8013/Electrical Fundamentals

This forty (40) hour course is designed to provide the basic skills in AC / DC motors and motor controls. The course provides an understanding of the operation of AC and DC motors and motor control circuits. Course topics include AC / DC motor operations, control circuit components, motor control wiring, connections, ladder diagrams, and interpretation of electronic motor control schematics.

FANUC Robotics Operations – CMNF 8241 – 40 hours

Prerequisite: None

This forty (40) hour course is designed to provide the basic skills needed to operate and program FANUC robots. Course topics include robotic safety, controls, operations, and handling tool programming.

Electronic Sensors – CELC 8022 – 24 hours

Prerequisite: CELC 8013/Electrical Fundamentals

This twenty-four (24) hour course introduces the student to the newest and the most important electronic automation (Must Know Technology) of today, and the future. The student will be introduced to the many types and boundary ranges of sensors. Adjusting and alignment of sensors where needed will be included in the coursework. Sinking and sourcing explanations along with NPN and PNP types of sensors are included in the class. Interfacing sensors with PLC inputs and troubleshooting field wiring will also be covered.

HandlingPRO (ROBOGUIDE) Workcell Simulation – CMNF 8283 – 16 hours

Prerequisite: CMNF 8241/FANUC Robotics Operations

This sixteen (16) hour course is designed to provide the skills needed for creating a computer 3D simulated robotic workcell using FANUC ROBOGUIDE. Course topics include: Creating a Workcell; Add Parts to the Workcell; Edit Robot Properties; Add End-of-Arm Tooling to the Robot; Add a Pick and Place Fixture to the Workcell; Create/Run a Robot Program; Create an AVI of the Workcell

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Advanced Robotics Operations – CMNF 8270 - 40 hours

Prerequisite: CMNF 8241/FANUC Robotics Operations

This forty (40) hour course is designed to provide the advanced skills needed to operate and program Fanuc robots. Course topics include collision guard, condition monitor function, executing multiple program (multi-tasking), program shift utility and systems operations.

Robotics Electrical Troubleshooting and Maintenance – CMNF 8090 – 40 hours

Prerequisite: CELC 8013/Electrical Fundamentals and CMNF 8241/FANUC Robotic Operations

This forty (40) hour course is designed to provide the basic skills needed to troubleshoot electrical repair and maintenance procedures of robotic electrical systems. Course topics include robot electrical component identification and function of robot electrical controller.

FANUC iRVision 2D – CMNF 8273 - 24 hours

Prerequisite: None

This twenty-four (24) hour course provides an understanding of how to program a vision system as a stand-alone solution and integrated into robotic systems. The student will understand general vision concepts, including camera setup, lighting, lensing, 2D Single & 2D Multiple View Process and perform hands-on programming with industrial vision systems.

Machining Essentials– CMNF 8293 - 24 hours

Perquisite: None

This twenty-four (24) hour course is designed to provide basic knowledge of manual machining equipment including grinders and sanders, drill press, lathes, and mills. Course topics include safety, speeds and feeds, drill press operation, Grinder operation and Saw operation.

Fluid Power Fundamentals – CMNF 8269 - 40 hours

Prerequisite: CMTH 8008/Shop Math

This forty (40) hour course is designed to provide the basic skills in fluid power. This course provides an understanding of fluid power symbols, basic components of fluid power systems including basic laws and formulas for fluid power calculations. Course topics include pumps, control valves, acuators, and maintenance procedures of fluid power systems.

Robotics Mechanical – CMNF 8242 – 40 hours

Prerequisite: None

This forty (40) hour course is designed to provide the detailed instructions and procedures necessary for complete disassembly, inspection, and reassembly of a FANUC robot mechanical unit.

Basic PLC – CMNF 8247 – 40 hours

Prerequisite: CELC 8013/Electrical Fundamentals and CELC 8012/Motor Controls & Drives

This forty (40) hour course is designed to provide skills in programmable logic controllers (PLC) fundamentals. The course provides a general understanding of PLC hardware, applications, and logic. Course topics include PLC hardware, navigation of PLC controller software, use of simple logic instructions, and basic trouble-shooting.

Optional Courses:

CBPR 8013	Blueprint Reading, GD&T, & Metrology	CMNF 8280	Advanced PLC Maintenance and Troubleshooting
CELC 8016	Digital Electronics	CMNF 8053	Hydraulics Fundamentals
CELC 8020	Electro Hydraulics and Pneumatics	CMNF 8207	Pneumatics Fundamentals
CMNF 8285	Intermediate PLC - 1	CMNF 8166	Mechanical Systems/Power Transmission
CMNF 8279	Intermediate PLC - 2	CMNF 8239	Automated Systems Troubleshooting

Upon successful completion of the Robot Technician Pathway and the optional courses, a student may choose to take a Siemens Mechatronic Systems Certification Level 1 exam.