SMART MANUFACTURING - MECHATRONICS, ASSOCIATE OF APPLIED SCIENCE

This program provides the skills and knowledge for a professional role in Manufacturing Automation, including automated process control; manufacturing big data analytics; interconnected Manufacturing processes, systems, and services; applying the technologies and the concepts of manufacturing Internet of Things, advanced robotics integration, and manufacturing cyber physical systems. The need for skilled workforce in Smart Manufacturing is a real need and will expand in upcoming years.

Program Admission Requirements

Applications may be submitted after meeting the following requirements:

- High School Diploma/GED
- Complete ENG-1010 College Composition I or ENG-101H Honors College Composition I
- MATH-0965 Intermediate Algebra with grade of "C" or higher; or appropriate score on Math placement test.

Program Learning Outcomes

This program is designed to prepare students to demonstrate the following learning outcomes:

a. Communicate effectively and efficiently with diverse individuals and teams, all levels of employees, customers, and suppliers by means of verbal, written (memos, reports, emails, etc.), graphics, symbols, and effective listening skills and using appropriate technology.

b. Complete tasks and projects on schedule through the effective use of time management, appropriate math skills, and teamwork that fosters inclusion, synergized efforts in problems identification, and troubleshooting for successful resolution of problems relating Smart Manufacturing/Industry 4.0 towards achieving set goals and objectives.

c. Utilize smart manufacturing technologies, tools, services, principles, concepts for the automation, troubleshooting, and control of manufacturing processes.

d. Incorporate safety awareness, principles and practices in every aspect work and as a way of life, including machine safety, environmental safety, chemical safety, and personal/employee protection.

e. Apply knowledge of machines' principles and operation, tools and materials, requisite mathematics and physics, to select operation parameters in order to program, setup, and operate production manufacturing equipment, and also to be able to, troubleshoot and diagnose industrial robots, cyber physical systems connectivity, controlled machines, and programmable logic controlled (PLC) equipment.

f. Apply the knowledge of material science, machining principles, blueprint/schematics, and hands on skills in CNC programming and operation, utilizing CAD/CAM technology.

g. Apply the knowledge of the principles of drafting and the communication of ideas, designs and visualization skills as the language of the engineering field, including the creation and interpretation of drawings using proper dimensioning and tolerancing for size and geometry, and use of computer aided drawing programs to incorporate proper industry acceptable standards and conventions.

h. Apply the basic principles of equipment maintenance, troubleshooting and problem solving techniques to maintain industrial machines that ensure the production of quality products.

i. Exhibit independence in the pursuits of continuous professional development.

j. Model ethical behavior of professional responsibilities.

First Semester		Credit Hours
EET-1220	Circuits and Electronics for Automation	3
ISET-1301	Mechanical/Electrical Print Reading	3
MET-1120	Computer Applications and Programming	2
MET-1230	Drawing & AutoCAD	3
MET-1640	Robotics and Programmable Logic Controllers in Process Automation	5
Select one of the following:		3
ENG-1010	College Composition I	
ENG-101H	Honors College Composition I	
	Credit Hours	**19**
Second Semester		
MATH-1530	College Algebra (or higher Approved Ohio Transfer 36 Mathematics course.)	4
ISET-1320	Fundamentals of Fluid Power	2
MET-1340	Introduction to Industry 4.0 and Vision Systems	4
MET-2601	3D Solid Modeling	3
HUM-1020	The Individual in Society	3
	Credit Hours	**16**
Third Semester		
EET-1600	Industrial Routers, Switches, and Operating Systems for Smart Manufacturing	2
ISET-2200	Industrial Motor Controls	3
MET-1410	Computer Aided Manufacturing Processes	3
PSY-1050	Introduction to Industrial/Organizational Psychology	3
DEGR-XXXX	Natural Science Requirement (lecture) [1]	3
	Credit Hours	**14**
Fourth Semester		
ENG-2151	Technical Writing	3
EET-1620	Industrial Protocols and Machine Connectivity for Smart Manufacturing	3
MET-2450	Robotics and Automation in Smart Manufacturing	4

MET-2460	Applied Programmable Logic Controllers and Mechatronic Systems	5
	Credit Hours	**15**
	Total Credit Hours	**64**

[1] Recommend PHYS-1210 College Physics I for students planning to transfer.

MATH-1140, MATH-1141, MATH-1200, MATH-1270, and MATH-1280 can no longer count towards fulfilling the college-level mathematics requirement. These courses were re-classified as developmental mathematics by the state of Ohio in 2016. Tri-C established a 5-year transitioning window for students who had completed these courses prior to 2016 to apply them towards meeting graduation requirements, which expired in Summer 2021. It is highly recommended to see a counselor to determine the appropriate math required for your current major.