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(ETAM) Initiative at Polk State College

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Executive Summary

The Employ Florida Banner Center for Advanced Manufacturing - headquartered at Polk State College – is a consortium of academic, workforce, economic development, and industry partners. The Consortium seeks to ensure that the knowledge, skills, and certifications of Florida’s manufacturing workforce are as modern as the microchips, metals, and medical devices they make. The Center’s solutions and products are deployed in education and training entities in Florida and across the United States. The Banner Center has compiled the following data in support of the Manufacturers Association of Florida (MAF) initiative to build upon the unified educational system in place by scaling the model of building educational pathways, aligned to career pathways in Advanced Manufacturing, through planning statewide, strategic deployment of the NAM-Endorsed Manufacturing Skills Certification System in Florida.

Despite double-digit unemployment in much of central Florida, job vacancies remain unfilled because there are too few workers with the technical skills required to work in advanced manufacturing. In a survey of industry employers conducted in 2007, a time when the total number of jobs in the manufacturing sector was declining, 80 percent of respondents reported having serious problems finding qualified candidates. Technology-based companies in Florida such as Florida Natural Growers, Mosaic, Coca-Cola, Tropicana, and Lockheed Martin are increasingly relying on automation and consolidated job functions to increase productivity. Yet even with this increased productivity, the Florida Agency for Workforce Innovation (AWI) predicts that there will be 8,275 new skilled worker manufacturing jobs statewide by 2014. Additionally, AWI projects that there will be three times as many manufacturing job vacancies (about 25,000) created as workers retire or move in response to an improved economy. There is a critical need for engineering technology education and training related to advanced manufacturing to address these existing and upcoming workforce needs and to keep the incumbent workforce abreast of rapidly changing technologies.

To address this demand for a knowledgeable and skilled advanced manufacturing workforce in Florida, key stakeholders have invested in the creation of a credential-based unified system of manufacturing education that links K-12 education, Technical Centers, Community & State Colleges, Workforce Training, Apprenticeship, and Industry Certification. This system allows for competency-based completion points that can be validated and directly cross-correlated. Instituting this reform has been a collaborative effort of the Employ Florida Banner Center for Advanced Manufacturing (Banner Center), the Florida Advanced Technological Education Center (FLATE), MAF, the Florida Department of Education (FL DOE), and Workforce Florida (WFI). The principle components of the system are:

- **Secondary** Career Academies (CAPE legislation & Perkins IV)
- **Secondary** and **Post-Secondary Adult Vocational** (PSAV) Automation and Production Technology (APT) Curriculum Frameworks
- Statewide **Engineering Technology AS/AAS degree**
- Formal **Apprenticeship** Programs in Maintenance Crafts – EIA & Mech.
- Statewide **Industry Certification-based Articulation** Agreements
- Industry relevant short-term **training** aligned with national credentials

Presently there are 20 Community and State Colleges offering one or more of the 15 degree programs that support advanced manufacturing talent development. Of these 15 programs only 2 have been specifically designed to align with national industry certifications. These 2 programs, the Engineering Technology and Supply Chain management AS degree programs, align with the MSSC CPT and AST&L certifications respectively. Community and State Colleges also have the opportunity to award College Credit Certificates (CCC’s) that are specialized blocks of courses within a degree program. There are 14 of these CCC’s within the Engineering Technology degree, one of which aligns with an industry certification – the Engineering Technology Support Specialist. There are 10 other CCC’s offered through the other manufacturing related degree programs.

Environmental Scan of Manufacturing Training/Education pathways in Florida

To support pathways to advanced manufacturing-related college degree programs articulation pathways from high school and non-credit training programs have been created. Florida high schools have the opportunity to establish industry certification aligned career academies. There are presently only 27 manufacturing-related programs in 18 of 67 school districts. Of these 27 programs only 2 align with the MSSC CPT certification. Linking these high school programs, and industry certification aligned training, to college credit has been accomplished by the creation of industry certification based statewide articulation agreements. There are now 102 of these agreements approved by the Florida Department of Education, 11 of these relate to advanced manufacturing, linking to 5 different degree programs.

Secondary Career Academy Programs

A high school student who is interested in directly entering the manufacturing workforce after secondary level education must have a broad spectrum of technical skills training to complement his or her basic academic education prior to entering the labor force. Typically, an employee is hired into a position due to their existing work experience, technical skills or education. The secondary level graduate has limited, if any, marketable work experience, education or technical skills. In contrast, local manufacturers seek qualified entry level employees who are able to step directly into the workforce with minimal assistance or training and national credentials to document their skill sets.

To support technical skill attainment, we have supported, and incentivized via the CAPE legislation, the creation of industry certification aligned Career Academies. These are small, personalized learning communities within a high school that select a subset of students and teachers for a two-, three-, or four-year span. Students enter the academy through a voluntary process; they must apply and be accepted with parental knowledge and support. A career academy involves teachers from different subjects working together as a team. Staff teams, who often share common planning time, work together to implement the key features of the model and provide students with exposure to the career field. Students are grouped together for several periods every day with a core group of teachers. This promotes a family-like atmosphere and results in close student-teacher ties.

Current manufacturing related career academies are presented in the following table:

District	Site	Academy
Alachua	Santa Fe High School	Institute of Biotechnology
Columbia	Columbia High School	Applied Welding
Dade	Miami Lakes Educational Center	Electronic Technology
Dixie	Dixie County High School	Dixie Academy of Welding Technology
Gulf	Port St. Joe High School	Shark Welding Academy
Hillsborough	Jefferson High School	Applied Welding
	Hillsborough High School	Applied Welding
	Tampa Bay Technical High School	Applied Welding
Lee	East Lee County High School	Academy of Engineering and Manufacturing
	Ida S. Baker High School	Academy of Engineering and Manufacturing

Environmental Scan of Manufacturing Training/Education pathways in Florida

Marion	North Marion High School	Biotechnology Academy
	Marion Technical Institute	Industrial Engineering Technology Academy
Okaloosa	Okaloosa Applied Technology Center	CHOICE High School Welding
Osceola	Liberty High School	Academy of Design and Manufacturing Technology
Palm Beach	Inlet Grove Community High School	Bio-technology
	Palm Beach Lakes High School	Biotechnology Academy
	Spanish River Community High School	Biotechnology Academy
	Seminole Ridge Community High School	Biotechnology Academy
Pinellas	Seminole Vocational Education Center	Electricity
Polk	Lake Gibson Senior High School	Industrial Biotechnology Academy
Putnam	Crescent City Jr.Sr. High School	Academy of Welding
	Palatka High School	Academy of Welding
St. Johns	Ponte Vedra High School	Academy of Biotechnology and Medical Research
	First Coast Technical College	Welding
St. Lucie	Treasure Coast High School	Manufacturing / Pre-Engineering Career Academy
Taylor	Taylor County High School	Electronics Technology
Volusia	Mainland High School	Academy of Design & Manufacturing Technology

Of these programs only the ones utilizing the “Automation and Production Technology” (APT) program framework specifically align with the MSSC CPT certification. The APT framework is designed to meet Florida’s need for a highly skilled, well-trained, and technically competent workforce in manufacturing and related industries. It was developed as part of a unified educational pathway for manufacturing talent development that links secondary career academies, industry certification, PSAV and apprenticeship programs, corporate training, and college degree programs. It is aligned with the MSSC CPT certification competencies and results from statewide focus groups conducted by the Banner Center for Advanced Manufacturing. The APT program is a 4 secondary course or a 4 OCP 600 contact hour PSAV program. It is structured so that each Secondary Course or OCP is aligned with one of the four MSSC CPT assessments:

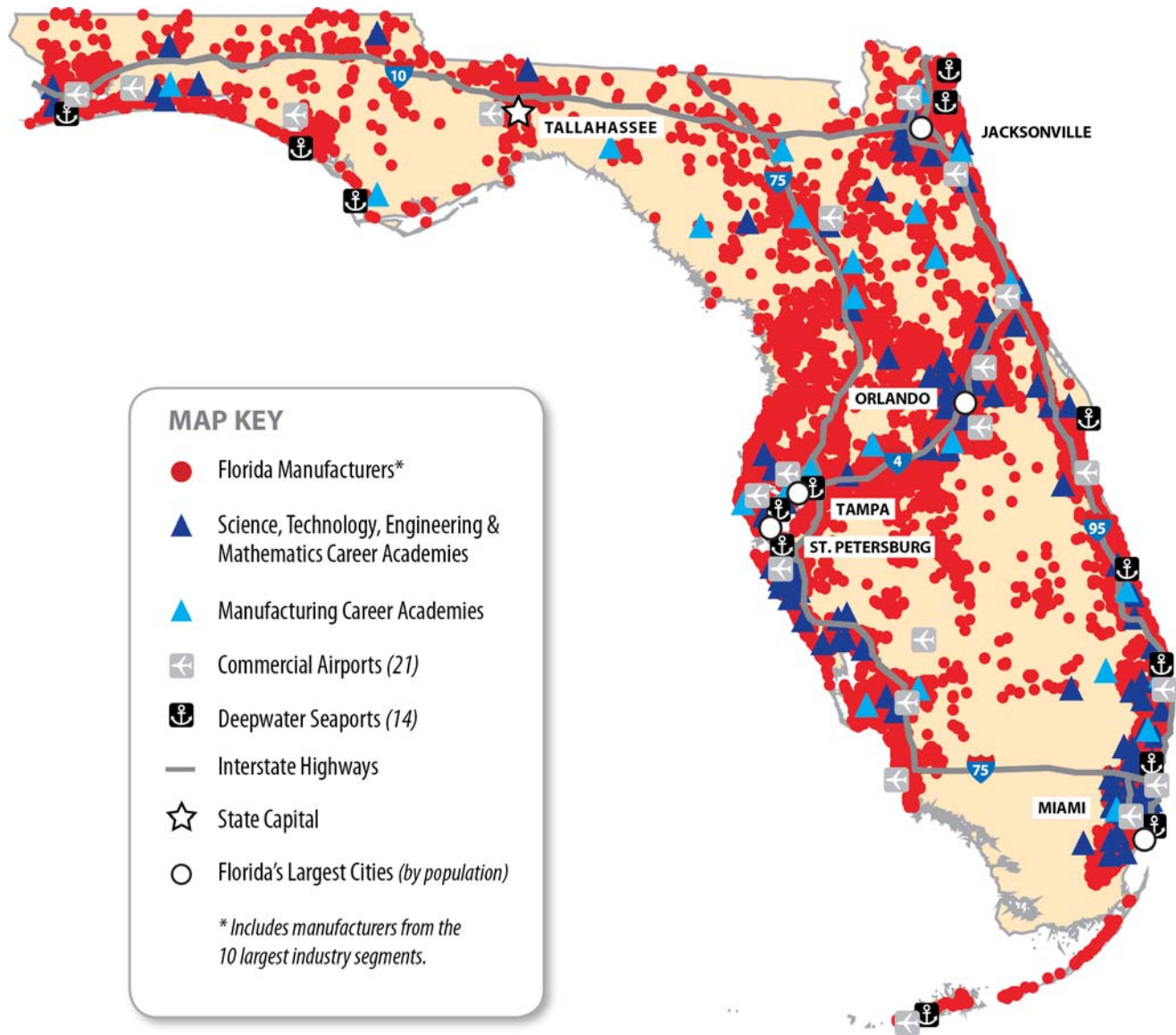
- Course 1 introduces APT and prepares a student to take the MSSC Safety assessment;
- Course 2 builds APT competencies and prepares a student to take the MSSC Quality Practices and Measurement assessment;
- Course 3 builds APT competencies and prepares the student to take the MSSC Maintenance Awareness assessment,
- Course 4 builds APT competencies and prepares the student to take the MSSC Mfg Processes & Production assessment.

This framework is appropriate for use in a pre-engineering, advanced manufacturing, and/or mechatronics program.

Environmental Scan of Manufacturing Training/Education pathways in Florida

The statewide articulation agreements in place for the MSSC CPT certification provide that the CPT will articulate college credit hours at any State or Community College offering the companion degree(s). Presently the three articulation agreements articulate as follows:

- **fifteen (15)** college credit hours to the AAS/AS Degree in **Engineering Technology**;
- **nine (9)** college credit hours to the AAS/AS Degree in **Manufacturing Technology**; or
- **six (6)** college credit hours to the AAS/AS Degree in **Electronics Engineering Technology**.



Environmental Scan of Manufacturing Training/Education pathways in Florida

Current STEM (Science Technology Engineering & Mathematics) related career academies are presented in the following table:

District	Site	Academy
Alachua	The Professional Academies Magnet @ Lofton High School	Academy of Design and Technology
Brevard	Astronaut High School	Academy of Engineering
	Bayside High School	Bayside Engineering Technology Academy (BETA)
	Merritt Island High School	daVinci Academy of Aeospace Engineering (Project Lead the Way)
	Space Coast Jr/Sr High School	STEAM Academy (Science Technology Engineering Aerospace & Manufacturing)
Broward	Everglades High School	Communications Technology
	Coral Springs High School	Communications Technology
	Hallandale High School	Communications Technology
	Fort Lauderdale High School	Communications Technology
	Piper High School	Communications Technology
	Western High School	Communications Technology
	Miramar High School	Communications Technology
	South Broward High School	Drafting/Illustrative Design Technology
	Northeast High School	Drafting/Illustrative Design Technology
	Cooper City High School	Drafting/Illustrative Design Technology
	Cooper City High School	Engineering Technology
	Coral Springs High School	Engineering Technology
	Cypress Bay High School	Engineering Technology
	Everglades High School	Engineering Technology
	South Plantation High School	Engineering Technology
	McArthur High School	Engineering Technology
	West Broward High School	Engineering Technology
	Western High School	Engineering Technology
	Piper High School	Engineering Technology
	Charles W. Flanagan High School	Engineering Technology
Charlotte	Lemon Bay High School	Academy of Science, Technology, Engineering & Mathematic (STEM)
	Charlotte High School	Academy of Science, Technology, Engineering &

Environmental Scan of Manufacturing Training/Education pathways in Florida

		Mathematics (STEM)
	Port Charlotte High School	Academy of Science, Technology, Engineering and Mathematics (STEM)
	Charlotte Technical Center	Aviation
Clay	Oakleaf High School	Academy of Aerospace Technology
	Orange Park High School	Academy of Engineering & Computer Science
	Keystone Heights Junior/Senior High School	Technology Academy
Dade	Hialeah Gardens Senior High School	Academy of Engineering (AOE) (NAF)
	Miami Sunset Senior High School	Academy of Engineering (AOE) (NAF)
	North Miami Senior High School	Aerospace Science & Engineering
	Miami Lakes Educational Center	Cambridge Engineering
	Dr. Michael M. Krop Senior High	Communications Technology
	Felix Varela Senior High School	Engineering
	Miami Central Senior High School	Engineering
	Miami Coral Park Senior High	Engineering
	Coral Reef Senior High School	Engineering
	Robert Morgan Educational Center	Engineering
	Hialeah Senior High School	Engineering, Construction, Science & Math
Duval	Frank H. Peterson Academies of Technology	Aviation Career Academy (ACA)
	Robert E. Lee High School	Engineering Academy
Escambia	Escambia High School	Engineering Academy (Project Lead The Way)
	West Florida High School of Advanced Technology	Engineering Academy (Project Lead The Way)
Gilchrist	Trenton High School	Academy of Construction and Engineering
Hillsborough	Robinson High School	Aerospace Technologies
	Sickles High School	Drafting/Illustrative Design
	Middleton High School	Drafting/Illustrative Design
	Plant City High School	Drafting/Illustrative Design
	Middleton High School	Pathways to Engineering
Jackson	Marianna High School	Engineering and Design Career Academy
Lake	Leesburg High School	Engineering Technology
Lee	Fort Myers High School	Academy of Engineering and Design

Environmental Scan of Manufacturing Training/Education pathways in Florida

	South Fort Myers High School	Academy of Engineering and Manufacturing Technology
Leon	Lawton Chiles High School	Engineering Academy
Manatee	Braden River High School	Engineering, Design & Leadership Academy
	Manatee High School	Innovation, Design, Engineering and Arts (IDEA) Center
	Bayshore High School	Pre-Engineering Academy
Marion	Forest High School	Engineering Manufacturing Institute of Technology (EMIT)
Martin	Jensen Beach High School	Academy of Engineering Technology
	Clark Advanced Learning Center	Engineering Technology Academy
Okaloosa	Choctawhatchee High School	Aerospace / Aviation
	CHOICE Institutes	Aerospace Institute
	Crestview High School	Aviation / Aerospace
	Niceville Senior High School	Aviation Academy
	Fort Walton Beach High School	Aviation Academy at FWBHS
Orange	Olympia High School	Academy of Design Technology
	Winter Park High School	Academy of Engineering
	Dr. Phillips High School	Certified Technology Academy
	Wekiva High School	Drafting Illustrative / Design Technology Academy
	Edgewater High School	Engineering Science and Technology
	Apopka High School	Engineering Technology Academy
	Cypress Creek High School	Institute of Science Technology, Engineering & Mathematics
	Wekiva High School	Lasers and Photonics Academy
	Oak Ridge High School	Project Lead The Way
	Timber Creek High School	Science, Technology Engineering Academy
Osceola	Poincianna High School	Academy of Engineering Technology
Palm Beach	Forest Hill High School	Academy of Engineering & Technology / Project Lead The Way (PLTW)
	Suncoast Community High School	Academy of Engineering and Technology
	Boca Raton Community High School	Academy of Engineering and Technology
	Boynton Beach Community High School	Boynton Aerospace and Science Academy (BASA)
	Wellington High School	Drafting and Design Academy

Environmental Scan of Manufacturing Training/Education pathways in Florida

	Lake Worth High School	Drafting and Design Academy
	Jupiter High School	Engineering Academy / Project Lead The Way (PLTW)
	Olympic Heights Community High School	Engineering Academy / Project Lead The Way (PLTW)
	Glades Central Community High School	Engineering Academy / Project Lead The Way (PLTW)
	Palm Beach Central High School	Engineering Technology Academy / Project Lead The Way (PLTW)
Pinellas	East Lake High School	Academy of Engineering
	Lakewood High School	Center for Advanced Technology (CAT)
Polk	Ridge Community High School	Engineering Technology Career Academy
St. Johns	Creekside High School	Academy of Environmental and Urban Planning
	St. Augustine High School	St. Johns County Aerospace Academy
	Allen D. Nease High School	Stellar Academy of Engineering
St. Lucie	Lincoln Park High School	Pre-Engineering Career Academy
Sarasota	North Port High School	Construction Technology
	Sarasota High School	Construction Technology (Entrepreneurial SLC)
	Booker High School	Construction Technology (Science, Construction, Research, Environmental, Architecture, & Math) (S.C.R.E.A.M. Academy)
	Sarasota High School	Drafting / Illustrative Design (Entrepreneurial SLC)
	North Port High School	Drafting / Illustrative Design
	Booker High School	Drafting / Illustrative Design (Science, Construction, Research, Environmental, Architecture & Math) (S.C.R.E.A.M. Academy)
	Sarasota High School	Engineering Technology (MaST SLC)
	Venice High School	Engineering Technology (Physical Sciences and Engineering Community)
	Riverview High School	Pathways to Engineering (Edison / Curie SLC)
	Suncoast Polytechnical High	Technology Studies
Seminole	Lake Mary High School	Science and Technology Academy
Volusia	Deltona High School	Academy of Drafting & Related Occupations
	Seabreeze High School	Academy of Drafting/Illustrative Design
	New Smyrna Beach High School	Academy of Engineering & Design (PLTW)

Environmental Scan of Manufacturing Training/Education pathways in Florida

	DeLand High School	Engineering Academy -- Drafting/Illustrative Design
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Postsecondary Adult Vocational (PSAV) Programs

PSAV programs are job preparatory programs offered at either Technical Career Centers or in some cases, State/Community Colleges. These are clock-hour, rather than credit-hour, based programs that provide the student with broad entry-level skills in the chosen field of study. In many cases statewide articulation agreements have been made to award credit for PSAV Certificate attainment in related AS/ASS degree programs.

County	Site	Program	CIP	Federal CIP	Clock Hours
Bay	Tom P. Haney Technical Center	Applied Welding Technologies	I480500	48.0508	1170
	Tom P. Haney Technical Center	Computer Systems Technology	I470104	47.0104	1650
Bradford	Bradford-Union Area Vocational Center	Applied Welding Technologies	I480500	48.0508	1170
	Bradford-Union Area Vocational Center	Computer Systems Technology	J500100	47.0104	900
	Bradford-Union Area Vocational Center	Computer Systems Technology	J500200	47.0104	750
Broward	Atlantic Technical Center	Applied Welding Technologies	I480500	48.0508	1170
	Atlantic Technical Center	Commercial Sign Design and Fabrication - APPR	I48020R	48.0299	10000
	Atlantic Technical Center	Elevator Constructor Mechanic - APPR	C60010R	47.0303	10000
	Atlantic Technical Center	Industrial Machinery Maintenance - APPR	I47031R	47.0303	10000
	Atlantic Technical Center	Machining - APPR	I48050R	48.0503	10000
	Atlantic Technical Center	Machining	I480503	48.0503	1500
	Atlantic Technical Center	Sheet Metal Fabrication Technology - APPR	I48052R	48.0506	10000
	McFatter Technical Center	Applied Welding Technologies	I480500	48.0508	1170
	Sheridan Technical Center	Gaming Machine Repair Technician	J550100	47.0000	270
Citrus	Withlacoochee Technical Institute	Applied Welding Technologies	I480500	48.0508	1170
	Withlacoochee Technical Institute	Industrial Machinery Maintenance 1	J590100	47.0303	750
	Withlacoochee	Industrial Machinery Maintenance 2	J590200	47.0303	600

Environmental Scan of Manufacturing Training/Education pathways in Florida

	Technical Institute				
	Withlacoochee Technical Institute	Industrial Machinery Maintenance	I470303	47.0303	1350
Dade	Miami Lakes Educational Center	Electronic Technology	I150303	15.0303	1400
	Miami Lakes Educational Center	Major Appliance and Refrigeration Repair	I470106	47.0106	1500
	Robert Morgan Educational Center	Applied Welding Technologies	I480500	48.0508	1170
	Robert Morgan Educational Center	Major Appliance and Refrigeration Repair 1	J620100	47.0106	600
	Robert Morgan Educational Center	Major Appliance and Refrigeration Repair 2	J620200	47.0106	900
	Robert Morgan Educational Center	Major Appliance and Refrigeration Repair	I470106	47.0106	1500
Duval	Fred D. Learey Technical Center: ISC, APPR, Sheetmetal Wks Loc 435	Sheet Metal Fabrication Technology - APPR	I48052R	48.0506	10000
Escambia	George Stone Technical Center	Applied Welding Technologies	I480500	48.0508	1170
	George Stone Technical Center	Major Appliance and Refrigeration Repair 1	J620100	47.0106	600
	George Stone Technical Center	Major Appliance and Refrigeration Repair 2	J620200	47.0106	900
	George Stone Technical Center: Escambia County Road Prison: ISC	Applied Welding Technologies	I480500	48.0508	1170
Gadsden	Gadsden Technical Institute - Not COE	Applied Welding Technologies	I480500	48.0508	1170
Hillsborough	D.G. Erwin Technical Center	Applied Welding Technologies	I480500	48.0508	1170
	Fred D. Learey Technical Center: ISC, APPR, Millwrights JAC	Millwright - APPR	I47032R	47.0303	10000
	Fred D. Learey Technical Center: ISC, APPR, Sheetmetal JAC	Sheet Metal Fabrication Technology - APPR	I48052R	48.0506	10000
	Henry W. Brewster Technical Center	Industrial Machinery Maintenance 1	J590100	47.0303	750
	Henry W. Brewster Technical Center	Industrial Machinery Maintenance 2	J590200	47.0303	600
	Henry W. Brewster Technical Center	Industrial Machinery Maintenance	I470303	47.0303	1350
Lake	Lake Technical Center	Applied Welding Technologies	I480500	48.0508	1170
Lee	Lee County High Tech Center Central	Applied Welding Technologies	I480500	48.0508	1170

Environmental Scan of Manufacturing Training/Education pathways in Florida

	Lee County High Tech Center Central	Electronic Technology	I150303	15.0303	1400
	Lee County High Tech Center North	Electronic System Assembly	I470129	47.0199	450
	Lee County High Tech Center North	Electronic Technology	I150303	15.0303	1400
Leon	Lively Area Vocational Technical Center	Applied Welding Technologies	I480500	48.0508	1170
	Lively Area Vocational Technical Center	Electronic Technology 1	J540100	15.0303	650
	Lively Area Vocational Technical Center	Electronic Technology 2	J540200	15.0303	750
	Lively Area Vocational Technical Center	Electronic Technology	I150303	15.0303	1400
Manatee	Manatee Technical Institute	Applied Welding Technologies	I480500	48.0508	1170
	Manatee Technical Institute	Boat & Yacht Repair/Refinishing Technology 1	J430100	49.0306	600
	Manatee Technical Institute	Boat & Yacht Repair/Refinishing Technology 2	J430200	49.0306	750
	Manatee Technical Institute	Boat and Yacht Repair/Refinishing Technology	I490316	49.0306	1350
	Manatee Technical Institute	Boatbuilding-Wood and Fabricated	I480799	48.0799	1350
	Manatee Technical Institute	Electronic Technology 1	J540100	15.0303	650
	Manatee Technical Institute	Electronic Technology 2	J540200	15.0303	750
	Manatee Technical Institute	Electronic Technology	I150303	15.0303	1400
	Manatee Technical Institute	Industrial Technology	I150603	15.0603	1600
	Manatee Technical Institute	Machining	I480503	48.0503	1500
	Manatee Technical Institute	Major Appliance and Refrigeration Repair 1	J620100	47.0106	600
	Manatee Technical Institute	Major Appliance and Refrigeration Repair 2	J620200	47.0106	900
	Manatee Technical Institute	Major Appliance and Refrigeration Repair	I470106	47.0106	1500
	Manatee Technical Institute	Precision Metal Fabrication 1	J310100	48.0504	850
	Manatee Technical Institute	Precision Metal Fabrication 2	J310200	48.0504	750
	Manatee Technical Institute	Precision Metal Fabrication	I480504	48.0504	1600
Marion	Marion County Comm Technical & Adult Ed	Applied Welding Technologies	I480500	48.0508	1170

Environmental Scan of Manufacturing Training/Education pathways in Florida

Okaloosa	Choice High School and Technical Center	Applied Welding Technologies	I480500	48.0508	1200
	Choice High School and Technical Center	Electronic Technology 1	J540100	15.0303	650
	Choice High School and Technical Center	Electronic Technology 2	J540200	15.0303	750
	Choice High School and Technical Center	Electronic Technology	I150303	15.0303	1400
Orange	OTEC Orlando Tech	Sewing Technology and Services	V200700	20.0306	900
	OTEC Westside Tech	Applied Welding Technologies	I480500	48.0508	1170
	OTEC Mid Florida Tech	Applied Welding Technologies	I480500	48.0508	1170
	OTEC Mid Florida Tech	Electronic Technology	I150303	15.0303	1400
	OTEC Mid Florida Tech	Machining	I480503	48.0503	1500
	OTEC Mid Florida Tech: 33rd St Correctional Facility: ISC	Applied Welding Technologies - PMT0013 Only	I480500	48.0508	125
Pinellas	PTEC - Clearwater Campus	Applied Welding Technologies	I480500	48.0508	1170
	PTEC - Clearwater Campus	Automation and Production Technology	J100100	150404	600
	PTEC - Clearwater Campus	Electronic Technology 1	J540100	15.0303	650
	PTEC - Clearwater Campus	Electronic Technology 2	J540200	15.0303	750
	PTEC - Clearwater Campus	Electronic Technology	I150303	15.0303	1400
	PTEC - Clearwater Campus	Industrial Machinery Maintenance 1	J590100	47.0303	750
	PTEC - Clearwater Campus	Industrial Machinery Maintenance 2	J590200	47.0303	600
	PTEC - Clearwater Campus	Industrial Machinery Maintenance	I470303	47.0303	1350
	PTEC - Clearwater Campus	Machining - APPR	I48050R	48.0503	10000
	PTEC - Clearwater Campus	Machining	I480503	48.0503	1500
	PTEC - St. Petersburg Campus	Industrial Machinery Maintenance - APPR	I47031R	47.0303	10000
	PTEC - St. Petersburg Campus	Jewelry Making and Repair 1	J450400	48.0602	900
	PTEC - St. Petersburg Campus	Jewelry Making and Repair 2	J450500	48.0602	750
	PTEC - St. Petersburg Campus	Jewelry Making and Repair	I480602	48.0602	1650
Polk	Ridge Career Center	Applied Welding Technologies	I480500	48.0508	1170

Environmental Scan of Manufacturing Training/Education pathways in Florida

	Traviss Career Center	Applied Welding Technologies	I480500	48.0508	1170
Putnam	First Coast Technical College - EX-Bargeport (Putnam)	Applied Welding Technologies	I480500	48.0508	1170
Santa Rosa	Radford M. Locklin Technical Center	Applied Welding Technologies	I480500	48.0508	1170
Seminole	Fred D. Learey Technical Center: ISC, APPR, E Cent FL JATC	Sheet Metal Fabrication Technology - APPR	I48052R	48.0506	10000
Taylor	Taylor Technical Institute	Applied Welding Technologies	I480500	48.0508	1170
	Taylor Technical Institute	Electrical and Instrumentation Technology 1	J110100	15.0404	1000
	Taylor Technical Institute	Electrical and Instrumentation Technology 2	J110200	15.0404	800
	Taylor Technical Institute	Electronic Technology 1	J540100	15.0303	650
	Taylor Technical Institute	Electronic Technology 2	J540200	15.0303	750
	Taylor Technical Institute	Electronic Technology	I150303	15.0303	1400
	Taylor Technical Institute	Industrial Machinery Maintenance 1	J590100	47.0303	750
	Taylor Technical Institute	Industrial Machinery Maintenance 2	J590200	47.0303	600
	Taylor Technical Institute	Millwright 1	J590400	47.0303	750
	Taylor Technical Institute	Millwright 2	J590500	47.0303	600
	Taylor Technical Institute	Millwright	I470313	47.0303	1350
Washington	Washington-Holmes Technical Center	Applied Welding Technologies	I480500	48.0508	1170

Community and State College Programs

Twenty of Florida's twenty-eight State and Community Colleges offer 15 degree programs related to advanced manufacturing. Of these, only the Engineering Technology (ET) and Supply Chain Management degrees are specifically designed to embed industry certification into the program. The ET Degree is designed to meet Florida's need for a highly skilled, well-trained, and technically competent workforce in manufacturing and related industries. It was developed as part of a unified educational pathway for manufacturing talent development that links secondary career academies, industry certification, PSAV and apprenticeship programs, corporate training, and college degree programs. This system has been created through a partnership between state and community colleges, the Florida Advanced Technological Education Center, the Banner Center for Manufacturing, school districts, industry, and the Florida Department of Education

Environmental Scan of Manufacturing Training/Education pathways in Florida

The ET degree is a comprehensive program that includes a set of technical core classes covering computer-aided drafting, electronics, instrumentation and testing, processes and materials, quality, and safety. These ET core courses align with the national Manufacturing Skill Standards Council Certified Production Technician (MSSC CPT) which validates the core competencies required for workers in high technology industries. The MSSC CPT was the first of Florida’s statewide articulation agreements, providing 15 credit hours towards the ET degree to anyone earning the certification. Beyond the ET core, colleges can choose to offer one or more of the eight specializations available to meet local industry needs. The degree program provides the fundamentals of production processes, the maintenance of those processes, quality assurance, and safety; followed by more in-depth study of automation and instrumentation, metrology, process improvements, total predictive maintenance, technical management competencies, as well as quality work practices utilizing Lean and Six Sigma principles. The ET degree has received national recognition from the premier voice in manufacturing, the National Association of Manufacturers (NAM). The degree is under consideration as a potential national model in manufacturing by the Manufacturing Institute – the research, education and workforce arm of NAM.

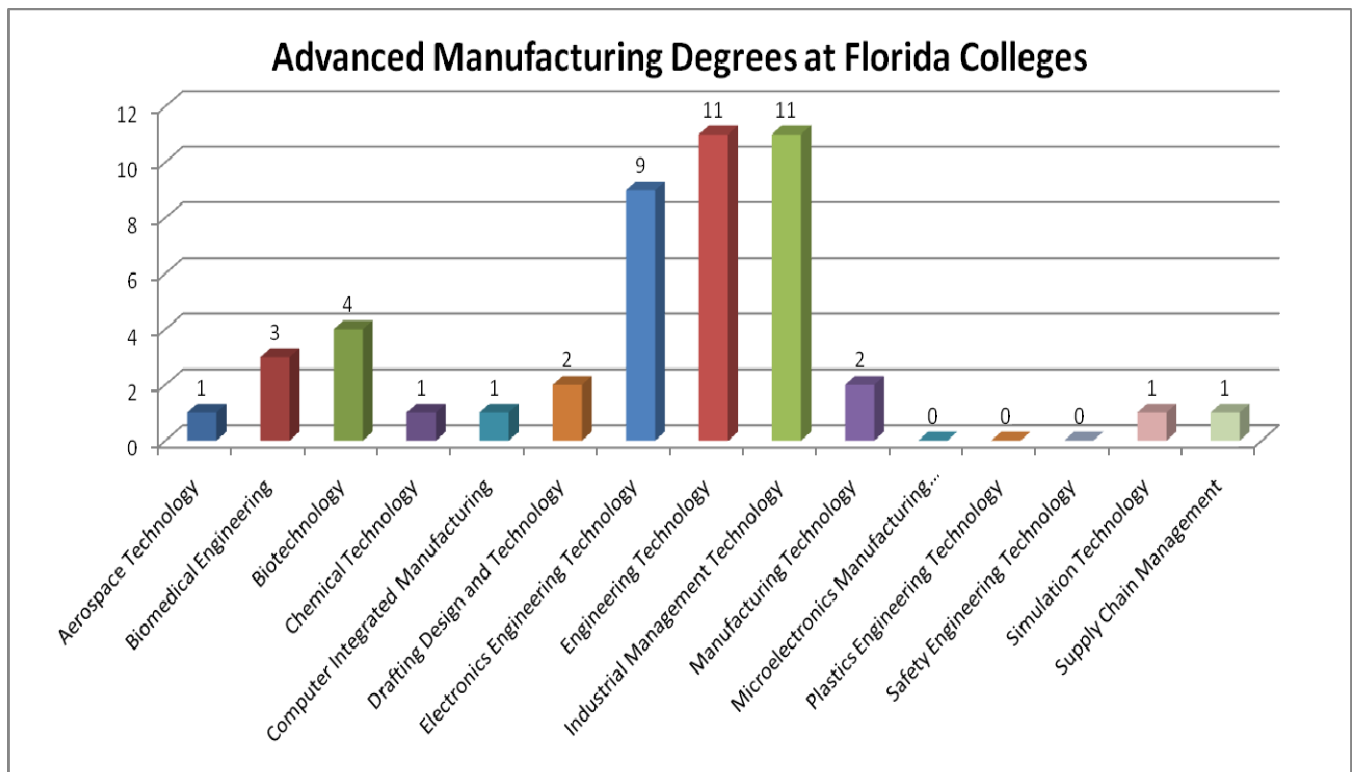
The Supply Chain Management degree, created by the Employ Florida Banner Center for Global Logistics, is also designed to embed industry certifications in the degree program that are linked to secondary career academies and workforce training. Specifically, the SCM degree contains core competencies aligned with the American Society of Transportation and Logistics (AST&L) Global Logistics Associate (GLA) and the MSSC Certified Logistics Associate (CLA) & Certified Logistics Technician (CLT) certifications. These certifications connect with the Global Logistics and Supply Chain Technology framework in support of secondary and PSAV programs. To complement this, the Employ Florida Banner Center for Logistics and Distribution is crafted a statewide articulation agreement that awards 9 credit hours in the SCM AS degree.

The data on the following five pages (compiled by the ETAM Initiative at Polk State College) provides an overview of the advanced manufacturing community and state college programs. The 15 degree programs offered by the 20 colleges are presented in the chart below and in the table on the following page.

Colleges	Aerospace Technology	Biomedical Engineering	Biotechnology	Chemical Technology	Computer Integrated Manufacturing	Drafting Design and Technology	Electronics Engineering Technology	Engineering Technology	Industrial Management Technology	Manufacturing Technology	Micro - electronics Manufacturing Technology	Plastics Engineering Technology	Safety Engineering Technology	Simulation Technology	Supply Chain Management
Polk State College							A.S.								
State College of Florida							A.A.S.								
Tallahassee Community College			A.S.				A.A.S.	pending	A.A.S.						
Brevard Community College	A.S.			A.S.				A.S. / A.A.S.							

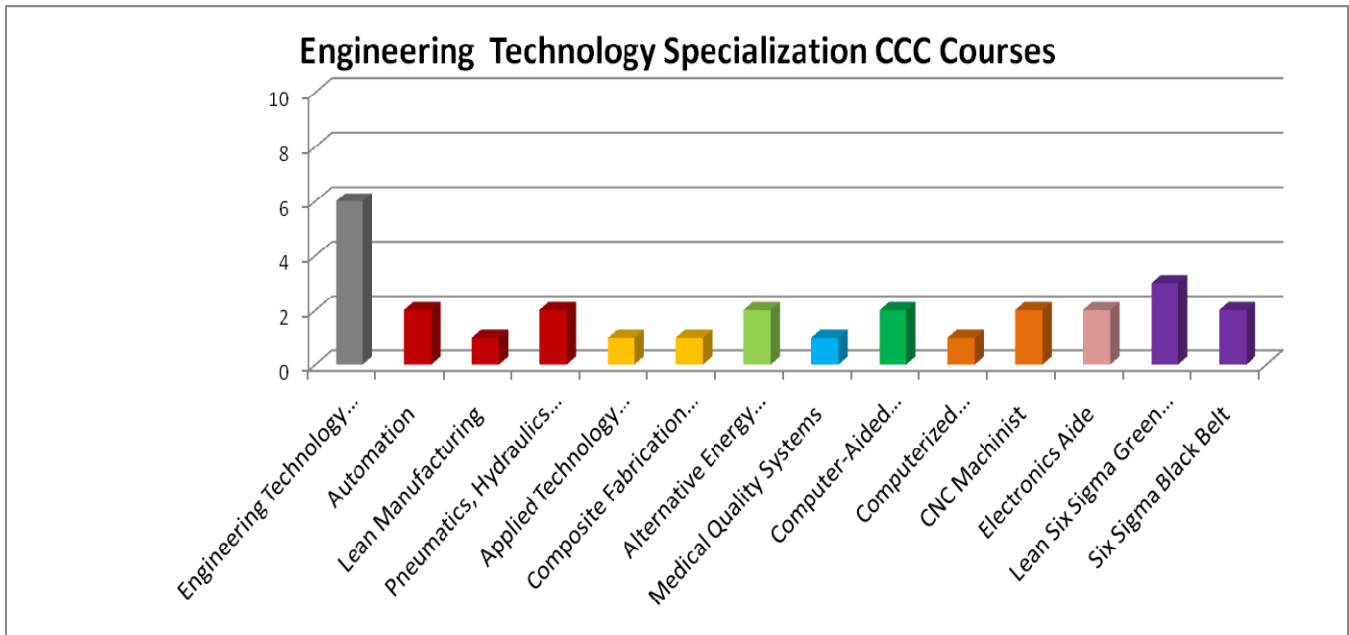
Environmental Scan of Manufacturing Training/Education pathways in Florida

College of Central Florida								A.S.								
Daytona State College						A.A.S.	A.S. / B.S.	B.S.	A.A.S.	A.S.					A.S.	
Florida Gateway College								A.S./A.A.S.								
Florida State College at Jacksonville		A.S.	A.S. Lab. Tech					A.S.	A.S. Military							A.S.
Gulf Coast Community College					A.A.S	A.A.S.	A.S.	A.A.S.								
Hillsborough Community College			A.S.				A.S. / A.A.S.	A.S / A.A.S.	A.A.S.							
Indian River State College							A.A.S.									
Miami-Dade College		A.S.					A.S. / B.S.									
Northwest Florida State College									A.A.S.	A.A.S						
Palm Beach State College									A.S.							
Pensacola State College							A.A.S.	A.A.S.	A.A.S.							
St. Johns River State College									A.S.							
St. Petersburg College								A.S.	A.A.S.							
Santa Fe College		A.A.S	A.S.													
South Florida Community College							A.S. / A.A.S.		A.S.							
Valencia Community College							A.S.		A.S.							
Frequency	1	3	4	1	1	2	9	11	11	2	0	0	0	0	1	1



Environmental Scan of Manufacturing Training/Education pathways in Florida

One of the most prevalent advanced manufacturing degrees offered is Engineering Technology (ET). This degree contains several specializations which are composed of one or more College Credit Certificates (CCC). Students may obtain these CCC's independently and uses the course credits towards an ET degree. The colleges, their ET specializations and associated CCC's are charted below.

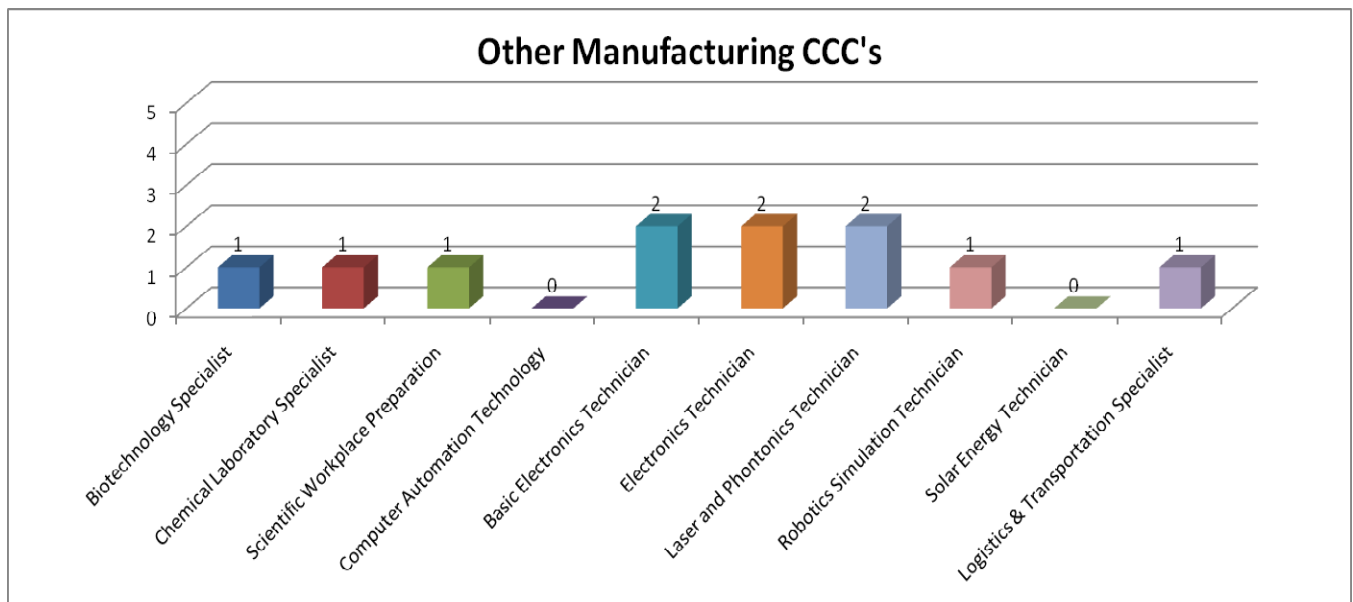


Colleges	Engineering Technology Support Specialist	Automation	Lean Manufacturing	Pneumatics, Hydraulics & Motors for Manufacturing	Applied Technology Specialist	Composite Fabrication and Testing	Alternative Energy Systems Specialist	Medical Quality Systems	Computer-Aided Design & Drafting	Computerized Woodworking	CNC Machinist	Electronics Aide	Lean Six Sigma Green Belt	Six Sigma Black Belt
Polk State College														
State College of Florida	X													
Tallahassee Community College									X					
Brevard Community College	X				X	X	X							
College of Central Florida	X												X	
Daytona State College														
Florida State College at Jacksonville		X		X							X			
Hillsborough Community	X	X	X	X								X		

Environmental Scan of Manufacturing Training/Education pathways in Florida

College														
Florida Gateway College	X												X	X
St. Petersburg College	X							X	X				X	X
Pensacola State College										X	X	X		
Gulf Coast Community College							X							
Frequency	6	2	1	2	1	1	2	1	2	1	2	2	3	2

Other advanced manufactured related College Credit Certificates (CCC's) outside of the Engineering Technology degree are also offered at Florida's community/state colleges. The additional CCC's and the colleges that offer them are represented below.



Colleges	Biotechnology Specialist	Chemical Laboratory Specialist	Preparation Workplace Scientific Technology Automation Computer Technician	Basic Electronics Technician	Electronics Technician	Laser and Photonics Technician	Robotics Simulation Technician	Solar Energy Technician	Logistics & Transportation Specialist
Polk State College									
State College of Florida									
Tallahassee Community College									
Brevard Community College		X	X						
College of Central Florida									
Daytona State College									

Environmental Scan of Manufacturing Training/Education pathways in Florida

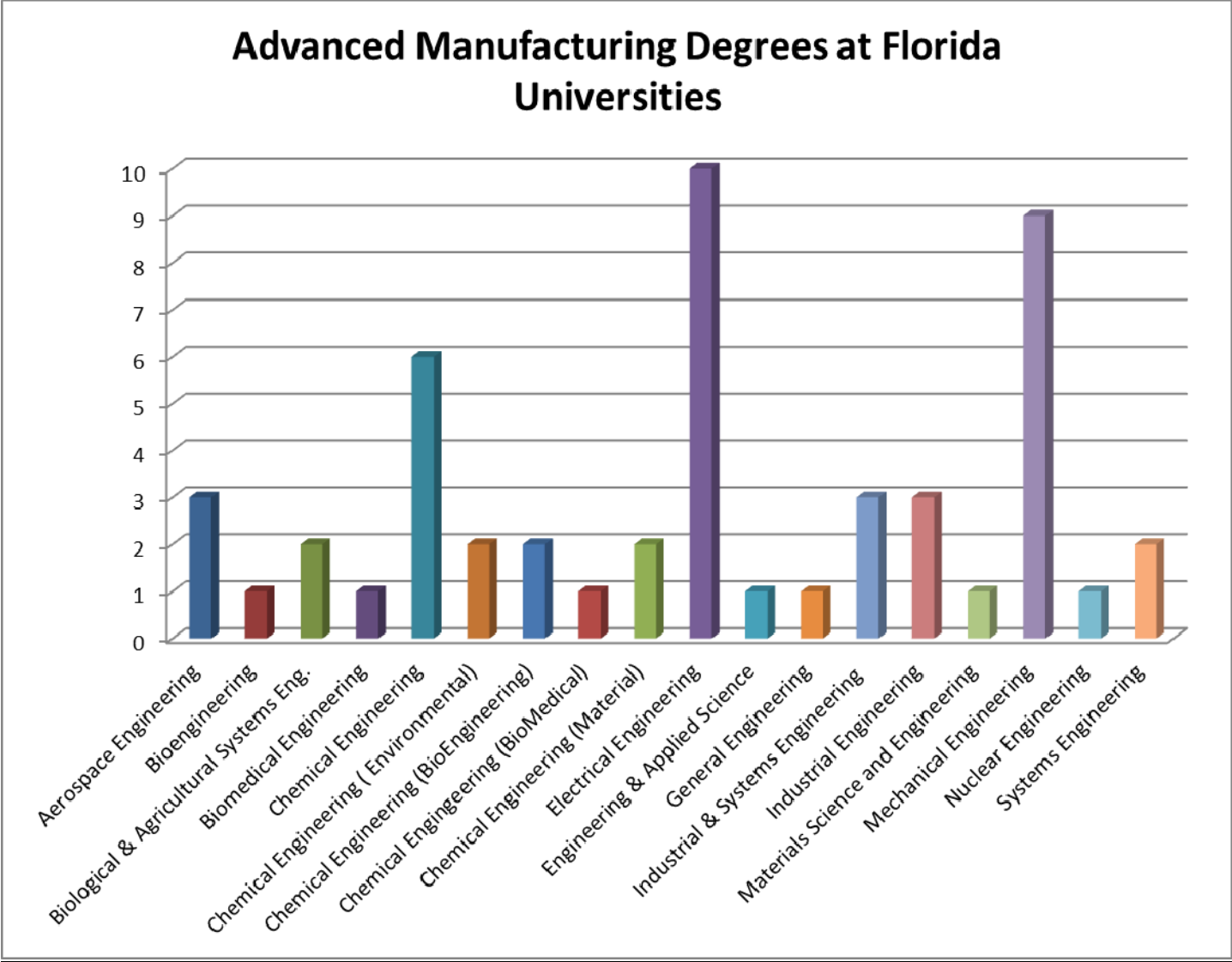
Florida Gateway College										
Florida State College at Jacksonville										
Gulf Coast Community College										
Hillsborough Community College	X					X				
Indian River Community College					X	X	X			
Miami-Dade College										
Northwest Florida State College										
Palm Beach State College										
Pensacola State College										
St. Johns River State College										X
St. Petersburg College										
Santa Fe College										
South Florida Community College										
Valencia Community College					X		X	X		
Frequency	1	1	1	0	2	2	2	1	0	1

University Programs

Florida's university programs are aligned with traditional engineering programs. The primary manufacturing related 4-year programs are the BSET and BSEET offered by Daytona State College and Miami Dade College listed in the previous section. At the baccalaureate level, Florida public and private universities offer 18 different engineering specializations that can broadly be related to advanced manufacturing. These programs traditionally reside within the colleges of engineering and have a more theoretical set of learning outcomes than the programs offered at the community and state colleges.

Environmental Scan of Manufacturing Training/Education pathways in Florida

Colleges	Aerospace Engineering	Bioengineering	Biological & Agricultural Systems Eng.	Biomedical Engineering	Chemical Engineering	Chemical Engineering (Environmental)	Chemical Engineering (BioEngineering)	Chemical Engineering (BioMedical)	Chemical Engineering (Material)	Electrical Engineering	Engineering & Applied Science	General Engineering	Industrial & Systems Engineering	Industrial Engineering	Materials Science and Engineering	Mechanical Engineering	Nuclear Engineering	Systems Engineering
Bethune-Cookman University																		
DeVry University																		
Eckard College											x							
Florida Agricultural and Mechanical University			x		x	x	x		x	x				x		x		
Florida Atalantic University										x						x		
Florida Gulf Coast University		x																
Florida Institute of Technology	x				x					x		x				x		
Florida International Univerisity				x	x					x			x			x		
Florida State University					x	x	x	x	x	x				x		x		
Jacksonville University																		
Polytechnic University of Puerto Rico																		
Technological University of America																		x
UNAD Florida																		x
University of Central Florida	x									x			x			x		
University of Florida	x		x		x					x			x		x	x	x	
University of North Florida										x						x		
University of South Florida					x					x				x		x		
University of West Florida										x								
Frequency	3	1	2	1	6	2	2	1	2	10	1	1	3	3	1	9	1	2



Apprenticeship

The purpose of the registered apprenticeship program is to enable employers to develop and apply industry standards to training programs for registered apprentices that can increase productivity and improve the quality of the workforce. Apprentices who complete registered apprenticeship programs are accepted by the industry as journeyworkers. By providing on-the-job training, related classroom instruction, and guaranteed wage structures, employers who sponsor apprentices provide incentives to attract and retain more highly qualified employees and improve productivity. Certifications earned through registered apprenticeship programs are recognized nationwide.

A single employer or a group of employers may choose to sponsor an apprenticeship program. Although sponsors define specific program standards, all registered programs must be aligned with industry occupational standards to provide authenticity and consistency in certification. Industry standards describe the skills to be mastered by workers to qualify for beginning-to-expert level occupations in various sectors of our nation's economy. The more specific standards written by program sponsors also define the selection process, wages earned by apprentices as training progresses, length of time the employer will provide on-the-job training, and number of classroom instruction hours required. Sponsors can elect to provide classroom instruction privately or enter into agreements with state-funded community colleges or school districts. Apprentices enrolled at public institutions are exempt from paying registration, matriculation, and lab fees. Unlike other workforce education programs offered at public institutions, sponsors select apprentices to participate in programs based on selection criteria that are defined in the program standards. The length of an apprenticeship program varies from one to five years depending on occupation training requirements. In Florida, the majority of apprentices train in traditional construction programs such as electricity, plumbing, pipefitting, and heating and air conditioning installation and repair. However, there many other programs provide training for machinists, childcare workers, chefs, mechanics, information technology specialists, and other "non-traditional" trades.

In alignment with the creation of a unified educational pathway for Florida's manufacturing workforce and to address the current skills shortage, an immediate need for new *multi-skill* maintenance personnel, concerns about the impending retirements, and small pool of talent in the pipeline experienced by the local manufacturing community – Polk State Corporate College has partnered with the Banner Center for Advanced Manufacturing, Rockwell Automation, and RWD Technologies, and The Mosaic Company (Mosaic) to create and offer structured competency-based apprenticeship training. This program includes apprenticeship training for both Electrical Instrumentation & Automation Technicians (EIA) and Mechanical/Millwright Craft. The program was created to align with the Department of Education's Journeyman requirements and consists of 1232 hours competency-based classroom instruction combined with on the job training (OJT). Specifically the program consists of the following instruction:

- The Banner Center's "Manufacturing Essentials" curriculum aligned with the MSSC CPT national certification – 5 Weeks;
- Industrial skills fundamentals curriculum – 18 Weeks;
- Trade-specific skills curriculum – 12 to 18 Months;
- Advanced standing for current incumbents to meet program requirements;
- Employer provided hands-on OJT.

Environmental Scan of Manufacturing Training/Education pathways in Florida

The program aligns with national certifications, corporate training of the incumbent workforce, and articulated credit into an Associate in Science (A.S.) degree in Engineering Technology with an Advanced Manufacturing specialization. This reform has resulted in a program that prepares the skilled craft workforce while providing academic credit and pathways into the statewide A.S. degree in Engineering Technology. Upon completion of the Mosaic apprenticeship program, the participants are elevated to full journeyman status at the Mosaic Company and obtain a pathway into Polk State's Engineering Technology degree program. Due to the inclusion of the MSSC CPT certification into the program, participants who successfully earn their CPT receive 15 credit hours towards the technical core of the degree based on a statewide articulation agreement already established in Florida. Then, based on the rigor of the technical training in the apprenticeship program, an additional 16 credit hours are articulated through internal articulation agreements between Polk State's Corporate College and the academic department. These 31 credit hours build a strong pathway to a degree designed to meet Florida's need for a highly skilled, well-trained, and technically competent workforce in manufacturing helping to meet the challenges of ever changing and increasingly complex manufacturing processes.

Mosaic EIA Technicians – [Electrician (Maintenance)]

Installs and repairs electrical systems, apparatus, and electrical and electronic components of industrial machinery and equipment, following electrical code, manuals, schematic diagrams, blueprints, and other specifications, using hand tools, power tools, and electrical and electronic test equipment. Installs power supply wiring and conduit for newly installed machines and equipment, such as robots, conveyors, and programmable controllers, following electrical code and blueprints, using hand tools and voltage tester. Connects power supply wires to machines and equipment, and connects cables and wires between machines and equipment, following manuals, schematic diagrams, and blueprints, using hand tools and test equipment. Diagnoses malfunctioning apparatus, such as transformers, motors, and lighting fixtures, using test equipment, and replaces damaged or broken wires and cables, using hand tools. Tests malfunctioning machinery, using test equipment, and discusses malfunction with other maintenance workers, such as Machine Repairer, Maintenance (any industry) 638.261-030 and Tool Maker, Maintenance (machine shop) 601.280-042, to diagnose malfunction. Replaces faulty electrical components of machine, such as relays, switches, and motors, and positions sensing devices, using hand tools. Diagnoses and repairs or replaces faulty electronic components, such as printed circuit boards [Electronics Tester (any industry) 726.261-018], using electronic test equipment and hand tools. Replaces electric motor bearings and rewires motors. May push buttons and press keys on robot controller, teach pendant, and programmable controller to program automated machinery, such as robots, to operate automated machinery, to test for malfunctions, and to verify repairs. May plan layout of wiring and install wiring, conduit, and electrical apparatus in buildings [Electrician (construction) 824.261-010]. May diagnose and replace faulty mechanical, hydraulic, and pneumatic components of machines and equipment. May be required to hold electrician's license. May be designated according to equipment repaired as Circuit-Breaker Mechanic (utilities); Electrician, Crane Maintenance (any industry); Electrician, Rectifier Maintenance (utilities); Salvage Repairer (utilities) I; Time Clock Repairer (elec. equip.); Transformer-Coil Winder (utilities); or according to work location as Electrician, Machine Shop (machine shop); Electrician, Refinery (petrol. refin.); Underground Repairer (utilities). May be designated: Watch Electrician (tel. & tel.); Wirer, Maintenance (utilities).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0643	The Mosaic Company - Bartow	8000	Rick Johnson	4	Polk

Environmental Scan of Manufacturing Training/Education pathways in Florida

	Facility IJ FL005091358				
0643	The Mosaic Company - Four Corners Facility IJ FL005091359	8000	Rick Johnson	4	Polk
0643	The Mosaic Company - Riverview Facility IJ FL005091360	8000	Rick Johnson	4	Polk

Mosaic Mechanic/Millwright – [Millwright]

Installs machinery and equipment according to layout plans, blueprints, and other drawings in industrial establishment, using hoists, lift trucks, hand tools, and power tools. Reads blueprints and schematic drawings to determine work procedures. Dismantles machines, using hammers, wrenches, crowbars, and other hand tools. Moves machinery and equipment, using hoists, dollies, rollers, and trucks. Assembles and installs equipment, such as shafting, conveyors, and tram rails, using hand tools and power tools. Constructs foundation for machines, using hand tools and building materials, such as wood, cement, and steel. Aligns machines and equipment, using hoists, jacks, hand tools, squares, rules, micrometers, and plumb bobs. Assembles machines, and bolts, welds, rivets, or otherwise fastens them to foundation or other structures, using hand tools and power tools. May operate engine lathe to grind, file, and turn machine parts to dimensional specifications. May repair and lubricate machines and equipment. May install robot and modify its program, using T3 teach pendant, T1. May perform installation and maintenance work as part of a team of skilled trades workers.

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0335	The Mosaic Company - Bartow Facility IJ FL005091358	8000	Rick Johnson	4	Polk
0335	The Mosaic Company - Four Corners Facility IJ FL005091359	8000	Rick Johnson	4	Polk
0335	The Mosaic Company - Riverview Facility IJ FL005091360	8000	Rick Johnson	4	Polk
0335	The Mosaic Company - South Fort Meade & Hookers Prairie Facility IJ FL005091361	8000	Rick Johnson	4	Polk

Other manufacturing sector apprenticeship programs:

Chemical Laboratory Technician

Conducts chemical and physical laboratory tests of solid materials, liquids, and gases, and analyzes test data for variety of purposes, such as research, product development, quality control, criminal investigation, and establishing standards, involving experimental, theoretical, or practical

Environmental Scan of Manufacturing Training/Education pathways in Florida

application of chemistry and related sciences: Sets up laboratory equipment and instrumentation required for tests, research, or process control. Tests and analyzes products, such as food, drugs, fertilizers, plastics, paints, detergents, paper, petroleum, and cement, to determine strength, stability, purity, chemical content, and other characteristics. Tests and analyzes materials and substances, such as ores, minerals, gases, soil, water, and pollutants. Documents results of tests and analyses. May prepare chemical solutions for use in processing materials, following standardized formulas or experimental procedures. May test and analyze radioactive and biological materials, applying knowledge of radiochemical procedures, emission spectrometry, and related techniques.

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0050	Seminole Electrical Cooperative JJ FL008950008	8000	James Pittman	2	Putnam

Electrician (Maintenance)

Installs and repairs electrical systems, apparatus, and electrical and electronic components of industrial machinery and equipment, following electrical code, manuals, schematic diagrams, blueprints, and other specifications, using hand tools, power tools, and electrical and electronic test equipment. Installs power supply wiring and conduit for newly installed machines and equipment, such as robots, conveyors, and programmable controllers, following electrical code and blueprints, using hand tools and voltage tester. Connects power supply wires to machines and equipment, and connects cables and wires between machines and equipment, following manuals, schematic diagrams, and blueprints, using hand tools and test equipment. Diagnoses malfunctioning apparatus, such as transformers, motors, and lighting fixtures, using test equipment, and replaces damaged or broken wires and cables, using hand tools. Tests malfunctioning machinery, using test equipment, and discusses malfunction with other maintenance workers, such as Machine Repairer, Maintenance (any industry) 638.261-030 and Tool Maker, Maintenance (machine shop) 601.280-042, to diagnose malfunction. Replaces faulty electrical components of machine, such as relays, switches, and motors, and positions sensing devices, using hand tools. Diagnoses and repairs or replaces faulty electronic components, such as printed circuit boards [Electronics Tester (any industry) 726.261-018], using electronic test equipment and hand tools. Replaces electric motor bearings and rewires motors. May push buttons and press keys on robot controller, teach pendant, and programmable controller to program automated machinery, such as robots, to operate automated machinery, to test for malfunctions, and to verify repairs. May plan layout of wiring and install wiring, conduit, and electrical apparatus in buildings [Electrician (construction) 824.261-010]. May diagnose and replace faulty mechanical, hydraulic, and pneumatic components of machines and equipment. May be required to hold electrician's license. May be designated according to equipment repaired as Circuit-Breaker Mechanic (utilities); Electrician, Crane Maintenance (any industry); Electrician, Rectifier Maintenance (utilities); Salvage Repairer (utilities) I; Time Clock Repairer (elec. equip.); Transformer-Coil Winder (utilities); or according to work location as Electrician, Machine Shop (machine shop); Electrician, Refinery (petrol. refin.); Underground Repairer (utilities). May be designated: Watch Electrician (tel. & tel.); Wirer, Maintenance (utilities).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0643	Central Florida Electrical JATC	8000	James (Jim) Sullivan Jr.	4	Orange

Environmental Scan of Manufacturing Training/Education pathways in Florida

	FL008660001				
0643	Flagler County Schools IJW FL001970011	8000	Nick Della Fave	2	Flagler
0643	Glades Electric Cooperative, Inc. IJW FL007780009	8000	Tony Powell	6	Glades
0643	Heartland Electrical Apprenticeship Program GNJ FL007890015	8000	Robert Hodge	6	Highlands
0643	Nassau County Board of County Commissioners IJ FL013091932	8000	Daniel Salmon	2	Nassau
0643	School Board of Broward County Florida Physical Plant Operations IJ FL007740006	8000	Steve Deery	7	Broward
0643	University of Florida Physical Plant Facilities IJ FL008900009	8000	Sara Hanson	2	Alachua

Electronics Mechanic

Repairs electronic equipment, such as computers, industrial controls, audio and video systems, radar systems, telemetering and missile control systems, transmitters, antennas, and servomechanisms, following blueprints and manufacturers' specifications, and using hand tools and test instruments. Converses with equipment operators to ascertain problems with equipment before breakdown, and to determine if breakdown is due to human error or mechanical problems. Tests faulty equipment and applies knowledge of functional operation of electronic units and systems to diagnose cause of malfunction. Tests electronic components and circuits to locate defects, using oscilloscopes, signal generators, ammeters, and voltmeters. Replaces defective components and wiring and adjusts mechanical parts, using hand tools and soldering iron. Aligns, adjusts, and calibrates equipment according to specifications. Calibrates testing instruments. Maintains records of repairs, calibrations, and tests. May enter information into computer to copy program from one electronic component to another, or to draw, modify or to store schematics, applying knowledge of software package used. May install equipment in industrial or military establishments and in aircraft and missiles. May operate equipment, such as communication equipment or missile control systems in ground and flight test, and be required to hold license from governmental agency. May be designated according to type of equipment repaired as Customer-Engineering Specialist (office machines); Electronics Mechanic, Computer (any industry); Radar Mechanic (any industry); Voting-Machine Repairer (government ser.).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0170	School Board of Broward County Florida Physical Plant Operations IJ FL007740006	8000	Steve Deery	7	Broward

Electronics Technician

Lays out, builds, tests, troubleshoots, repairs and modifies developmental and production electronic components, parts, equipment, and systems, such as computer equipment, missile control instrumentation, electron tubes, test equipment, and machine tool numerical controls, applying principles and theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics. Discusses layout and assembly procedures and problems with Electronics ENGINEER (profess. & kin.) 003.061-030 and draws sketches to clarify design details and functional criteria of electronic units. Assembles experimental circuitry (breadboard) or complete prototype model according to engineering instructions, technical manuals, and knowledge of electronic systems and components. Recommends changes in circuitry or installation specifications to simplify assembly and maintenance. Sets up standard test apparatus or devises test equipment and circuitry to conduct functional, operational, environmental, and life tests to evaluate performance and reliability of prototype or production model. Analyzes and interprets test data. Adjusts, calibrates, aligns, and modifies circuitry and components and records effects on unit performance. Writes technical reports and develops charts, graphs, and schematics to describe and illustrate system's operating characteristics, malfunctions, deviations from design specifications, and functional limitations for consideration by engineers in broader determinations affecting system design and laboratory procedures. May operate bench lathes, drills, or other machine tools to fabricate parts, such as coils, terminal boards, and chassis. May check functioning of newly installed equipment in aircraft, ships, and structures to evaluate system performance under actual operating conditions. May instruct and supervise other technical personnel. May be designated according to specialization in electronic applications, as Computer-Laboratory Technician (profess. & kin.); Development-Instrumentation Technician (profess. & kin.); Electronic-Communications Technician (profess. & kin.); Electronics Technician, Nuclear Reactor (profess. & kin.); Experimental Electronics Developer (aircraft mfg.); Systems-Testing-Laboratory Technician (profess. & kin.).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0169	School Board of Broward County Florida Physical Plant Operations UJ FL007740006	8000	Steve Deery	7	Broward

Instrument Technician

Inspects, tests, adjusts, and repairs electric, electronic, mechanical, and pneumatic instruments and systems used to indicate, record, and control generating operations in conventional or nuclear power electric generating plant: Inspects meters, indicators, and gauges to detect abnormal fluctuations. Tests accuracy of flowmeters, pressure gauges, temperature indicators, controllers, radiation counters or detectors, and other recording, indicating or controlling instruments to locate defective components in system, using test equipment, such as pressure gauges, mercury manometers, potentiometers, pulse and signal generators, oscilloscopes, transistor curve tracers, and ammeters, voltmeters, and wattmeters. Traces out and tests electronic solid state and vacuum tube circuitry and components to locate defective parts in analog and digital, protection, or radiation monitoring systems, using test equipment, schematics, and maintenance manuals. Removes defective instruments from system, decontaminates, disassembles, and cleans instruments, and replaces defective parts, using handtools. Reassembles instruments and replaces instruments in system, using handtools. Lubricates instruments and replaces defective wiring and tubing. Calibrates readings on instruments according to standards

Environmental Scan of Manufacturing Training/Education pathways in Florida

and adjusts phasing and aligns stages to ensure accuracy of recording and indicating function. Records calibrations made, parts and components used, and inventory of parts on hand. Prepares schematic drawings, sketches, and reports to reflect changes or alterations made in instruments, circuits, and systems. May be designated according to type power plant as Nuclear-Plant-Instrument Technician (utilities); Instrument Repairer, Stem Plant (utilities)

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0252	Seminole Electrical Cooperative II FL008950008	8000	James Pittman	2	Putnam

Machinist

Sets up and operates conventional, special-purpose, and numerical control (NC) machines and machining centers to fabricate metallic and nonmetallic parts, and fits and assembles machined parts into complete units, applying knowledge of machine shop theory and procedures, shop mathematics, machinability of materials, and layout techniques. Studies blueprints, sketches, drawings, manuals, specifications, or sample part to determine dimensions and tolerances of finished work piece, sequence of operations, and setup requirements. Measures, marks, and scribes dimensions and reference points on material or work piece as guides for subsequent machining [Lay-Out Worker (machine shop) 600.281-018]. Selects, aligns, and secures holding fixtures, cutting tools, attachments, accessories, and materials on machines, such as mills, lathes, jig borers, grinders, and shapers. Calculates and sets controls to regulate machining factors, such as speed, feed, coolant flow, and depth and angle of cut, or enters commands to retrieve, input, or edit computerized machine control media. Starts and observes machine operation to detect malfunctions or out-of-tolerance machining, and adjusts machine controls or control media as required. Verifies conformance of finished work piece to specifications, using precision measuring instruments. Sets up and operates machine on trial run to verify accuracy of machine settings or programmed control data. Fits and assembles parts into complete assembly, using jigs, fixtures, surface plate, surface table, hand tools, and power tools. Verifies dimensions and alignment of assembly, using measuring instruments, such as micrometers, height gauges, and gauge blocks. May install machined replacement parts in mechanisms, machines, and equipment, and test operation of unit to ensure functionality and performance. May operate welding equipment to cut or weld parts. May develop specifications from general description and draw sketch of part or product to be fabricated. May confer with engineers, production personnel, programmers, or others to resolve machining or assembly problems. May specialize in setting up and operating NC machines and machining centers and be designated Numerical Control Machine Machinist (machine shop); or set up and operate NC machines linked to automated storage, retrieval, and moving devices and be designated Flexible Machining System Machinist (machine shop).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0296	Brevard Machinist Apprenticeship Program, Inc. GNJ FL001980005	8000	Alice Jones	4	Brevard
0296	M. A. Ford Manufacturing INJ FL002080193	8000	Norma Wardlow	7	Indian River
0296	Performance Machining Services,	8000	Jason Phillips	1	Escambia

Environmental Scan of Manufacturing Training/Education pathways in Florida

	Inc. INJ FL010070001				
0296	South Florida Manufacturing Associations GNJ FL011090024	8000	Dennis Segalewitz	7	Broward
0296	Tampa Bay Machining Apprenticeship GNJ FL007900006	8000	Richard McConnaughey	6	Pinellas

Maintenance Mechanic

Repairs and maintains, in accordance with diagrams, sketches, operation manuals, and manufacturer's specifications, machinery and mechanical equipment, such as engines, motors, pneumatic tools, conveyor systems, and production machines and equipment, using hand tools, power tools, and precision-measuring and testing instruments. Observes mechanical devices in operation and listens to their sounds to locate causes of trouble. Dismantles devices to gain access to and remove defective parts, using hoists, cranes, hand tools, and power tools. Examines form and texture of parts to detect imperfections. Inspects used parts to determine changes in dimensional requirements, using rules, calipers, micrometers, and other measuring instruments. Adjusts functional parts of devices and control instruments, using hand tools, levels, plumb bobs, and straightedges. Repairs or replaces defective parts, using hand tools and power tools. Installs special functional and structural parts in devices, using hand tools. Starts devices to test their performance. Lubricates and cleans parts. May set up and operate lathe, drill press, grinder, and other metalworking tools to make and repair parts. May initiate purchase order for parts and machines. May repair electrical equipment. May be designated according to machine repaired as Carton-Forming-Machine Adjuster (any industry); Machine Adjuster (tobacco); Maintenance Mechanic, Record Processing Equipment (recording).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0308	JEA IJW FL008910005	8000	Wes Grant	2	Duval
0308	Mercury Marine INJ FL005060003	8000	Lea Goodman	4	Osceola
0308	University of Florida Physical Plant Facilities IJ FL008900009	8000	Sara Hanson	2	Alachua

Maintenance Repairer, Industrial

Installs, maintains, and repairs machinery, equipment, physical structures, and pipe and electrical systems in commercial or industrial establishments, following specifications, blueprints, manuals, and schematic drawings, using hand tools, power tools, hoist, crane, and measuring and testing instruments. Visually inspects and tests machinery and equipment, using electrical and electronic test equipment. Listens for unusual sounds from machines or equipment to detect malfunction and discusses machine operation variations with supervisors or other maintenance workers to diagnose problem or repair machine. Dismantles defective machines and equipment and installs new or repaired parts, following specifications and blueprints, using precision measuring instruments and hand tools [Machine Repairer, Maintenance (any industry) 638.261-030]. Cleans and lubricates shafts, bearings, gears, and other parts of machinery, using rags, brushes, and

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grease gun. Installs and repairs electrical apparatus, such as transformers and wiring, and electrical and electronic components of machinery and equipment [Electrician, Maintenance (any industry) 829.261-018]. Lays out, assembles, installs, and maintains pipe systems and related hydraulic and pneumatic equipment, and repairs and replaces gauges, valves, pressure regulators, and related equipment [Pipe Fitter (construction) 862.281-022]. Repairs and maintains physical structure of establishment [Maintenance Repairer, Building (any industry) 899.381-010]. May install machinery and equipment according to blueprints and other specifications [Millwright (any industry) 638.281-018]. May install, program, or repair automated machinery and equipment, such as robots or \$T3 programmable controllers.\$T1 May set up and operate machine tools, such as lathe, grinder, drill, and milling machine to repair or fabricate machine parts, jigs and fixtures, and tools. May operate cutting torch or welding equipment to cut or join metal parts. May fabricate and repair counters, benches, partitions, and other wooden structures.

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0311	Orlando Plumbers & Pipefitters JAC FL008470001	8000	Carl Gregory	4	Orange

Millwright

Installs machinery and equipment according to layout plans, blueprints, and other drawings in industrial establishment, using hoists, lift trucks, hand tools, and power tools. Reads blueprints and schematic drawings to determine work procedures. Dismantles machines, using hammers, wrenches, crowbars, and other hand tools. Moves machinery and equipment, using hoists, dollies, rollers, and trucks. Assembles and installs equipment, such as shafting, conveyors, and tram rails, using hand tools and power tools. Constructs foundation for machines, using hand tools and building materials, such as wood, cement, and steel. Aligns machines and equipment, using hoists, jacks, hand tools, squares, rules, micrometers, and plumb bobs. Assembles machines, and bolts, welds, rivets, or otherwise fastens them to foundation or other structures, using hand tools and power tools. May operate engine lathe to grind, file, and turn machine parts to dimensional specifications. May repair and lubricate machines and equipment. May install robot and modify its program, using T3 teach pendant, T1. May perform installation and maintenance work as part of a team of skilled trades workers.

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0335	North Florida Carpenters JAC FL008510001	8000	Billy Campbell	2	Duval
0335	South Florida Millwrights, Pile Drivers & Highway Construction JAC FL007790004	8000	Frank DeAnglio	7	Broward
0335	Tampa Millwrights JAC FL007670002	8000	Gary Cothron	4	Hillsborough

Mold Maker, Die-Cast & Plastic Molding

Lays out, machines, fits, assembles, and finishes metal parts to make and repair dies for die-casting of metal products and metal molds for injection or compression molding of plastic or glass

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products, analyzing specifications, and applying knowledge of die and mold design and construction. Studies blueprints of product and die or mold, and computes specifications, applying knowledge of shop mathematics and metal die-casting or plastic or glass molding processes and machinery. Plans sequence of operations, visualizing shape of die or mold in reverse of product. Measures, marks, and scribes metal stock to lay out for machining [Lay-Out Worker (machine shop)]. Gives machining specifications to Tool-Machine Set-Up Operators (machine shop) or sets up and operates machines, such as horizontal boring mill, engine lathe, profile milling machine, and pantograph machine to machine outer dimensions and contoured cavity of die or mold [Tool-Machine Set-Up Operator (machine shop); Pantograph-Machine Set-Up Operator (machine shop)]. Grinds, files, and sands parts, using files, emery cloth, and powered grinders, to fit parts for assembly and to smooth and finish cavity. Assembles die or mold, using hand tools. Verifies dimensions, using calipers, T3 planer gauges, T1 and dial indicators. May repair molds and be designated Mold Repairer, Die-Casting And Plastic Molding (machine shop).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0116	Manasota Manufacturing Technology GNJ FL004030001	8000	Tom Karr	6	Sarasota
0116	Tampa Bay Machining Apprenticeship GNJ FL007900006	8000	Richard McConnaughey	6	Pinellas

Numerical Control Machine Operator

Sets up and operates numerical control machine to cut, shape, or form metal work pieces to specifications. Reviews setup sheet and specifications to determine setup procedure, machining sequence, and dimensions of finished work piece. Attaches fixture to machine bed and positions and secures work piece in fixture according to setup instructions, using clamps, bolts, hand tools, power tools, and measuring instruments, such as rule and calipers. Assembles cutting tools in tool holders and positions tool holders in machine spindles as specified, using hand tools, or inserts cutting tools in specified machine magazines. Loads control media, such as disk, tape, or punch card, in machine control console or enters commands to retrieve preprogrammed machine instructions from data base. Manipulates controls and enters commands to index cutting tool to specified T3set pointT1 and to start machine. Observes and listens to machine operation to detect malfunctions, such as worn or damaged cutting tools. Changes cutting tools and location of work piece during machining process as specified in setup instructions. Measures work piece for conformance to specifications, using measuring instruments, such as micrometers, dial indicators, and gauges. Notifies supervisor of discrepancies. May adjust machine feed and speed and change cutters to machine parts according to specifications when automatic programming is faulty or machine malfunctions. May machine materials other than metal, such as composites, plastic, and rubber.

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0845	Arthrex Manufacturing Apprenticeship Program INJ FL006090032	8000	Michael Koszewnik	6	Collier

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0845	Manasota Manufacturing Technology GNJ FL004030001	8000	Tom Karr	6	Sarasota
0845	Tampa Bay Machining Apprenticeship GNJ FL007900006	8000	Richard McConnaughey	6	Pinellas

Pipe Fitter

Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints. Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air-conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks. May weld pipe supports to structural steel members. May observe production machines in assigned area of manufacturing facility to detect machinery malfunctions. May operate machinery to verify repair. May modify programs of automated machinery, such as robots and conveyors, to change motion and speed of machine, using T3 teach pendant, T1 control panel, or keyboard and display screen of T3 robot controller T1 and T3 programmable controller T1. May be designated Steam Fitter (construction) when installing piping systems that must withstand high pressure. May be designated according to type of system installed as Pipe Fitter, Ammonia (construction); Pipe Fitter, Fire-Sprinkler Systems (construction); Pipe Fitter, Gas Pipe (construction); or type of piping used as Pipe Fitter, Plastic Pipe (construction); Pipe Fitter, Soft Copper (construction). May be designated: Airdox Fitter (mine & quarry); Freight-Air-Brake Fitter (railroad equip.); Instrument Fitter (construction); Maintainer, Sewer-And-Waterworks (construction); Pipe Fitter, Maintenance (any industry); Pipe Fitter, Welding (construction); Pneumatic-Tube Fitter (construction); Sprinkler-And-Irrigation-System Installer (construction); Tuyere Fitter (steel & rel.).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0414	ABCI Pipe Fitter/Sprinkler Fitter GNJ FL007890028	8000	Ruth Tirado	7	Broward
0414	City of Pinellas Park Street Maintenance Apprenticeship IJW FL006030006	8000	William Howey	6	Pinellas

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0414	City of St. Petersburg IJW FL007860011	8000	Jossie Espinosa	6	Pinellas
0414	Dade County A/C, Refrigeration & Pipefitting Education Committee JAC FL007490002	8000	Phil Rodin	7	Dade
0414	Daytona Beach Plumbers & Pipefitters JAC FL008500001	8000	Jimmy Hilderbrand	2	Volusia
0414	Florida Sprinkler Fitters, Local #821 JATC FL007530001	8000	Greg Smith	2	Duval
0414	Ivey Mechanical Company, LLC INJ FL008030001	8000	Thomas Swafford	2	Duval
0414	Jacksonville Plumbers & Pipefitters JAC FL008480001	8000	Jerry Thomas	2	Duval
0414	Orlando Plumbers & Pipefitters JAC FL008470001	8000	Carl Gregory	4	Orange
0414	Palm Beach County Plumbing, A/C & Pipefitting JAC FL007450003	8000	William Keene Jr.	7	Palm Beach
0414	Pensacola Plumbers & Steamfitters JAC FL007520001	8000	Kenneth Lacey	1	Escambia
0414	Tampa Bay Pipe Trades JATC FL007630001	8000	Lee Middleton	4	Hillsborough
0414	Tri-County Apprenticeship Academy GNJ FL004040001	8000	Christine Rodriguez	6	Lee
0414	University of Florida Physical Plant Facilities IJ FL008900009	8000	Sara Hanson	2	Alachua

Pump Servicer

Repairs pumps and pump power units, such as centrifugal and plunger-type pumps, and diesel-engine, gasoline-engine, and electric-motor power units, using hoists and hand tools. Diagnoses trouble in pumps. Dismantles pumps and repairs or replaces defective parts, using hand tools. Reseats and grinds valves. Tests performances of repaired pumps. May wire motor to switchboard and install fuse box. May be designated according to type of pump repaired as Water-Pump Servicer (any industry).

Occ	Program Name	Program	Sponsor	Region	District
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Code		Hours			
0933	School Board of Broward County Florida Physical Plant Operations JJ FL007740006	6000	Steve Deery	7	Broward

Sheet Metal Worker

Plans, lays out, fabricates, assembles, installs, and repairs sheet metal parts, equipment, and products, utilizing knowledge of working characteristics of metallic and nonmetallic materials, machining, and layout techniques, using hand tools, power tools, machines, and equipment. Reads and interprets blueprints, sketches, or product specifications to determine sequence and methods of fabricating, assembling, and installing sheet metal products. Selects gauge and type of sheet metal, such as galvanized iron, copper, steel, or aluminum, or nonmetallic material, such as plastics or fiberglass, according to product specifications. Lays out and marks dimensions and reference lines on material, using scribes, dividers, squares, and rulers, applying knowledge of shop mathematics and layout techniques to develop and trace patterns of product or parts [Sheet-Metal Lay-Out Worker (any industry) 809.281-010] or using templates. Sets up and operates fabricating machines, such as shears, brakes, presses, forming rolls, and routers, to cut, bend, block and form, or straighten materials. Shapes metal material over anvil, block, or other form, using hand tools. Trims, files, grinds, deburrs, buffs, and smooths surfaces, using hand tools and portable power tools. Welds, solders, bolts, rivets, screws, clips, caulks, or bonds component parts to assemble products, using hand tools, power tools, and equipment. Installs assemblies in supportive framework according to blueprints, using hand tools, power tools, and lifting and handling devices. Inspects assemblies and installation for conformance to specifications, using measuring instruments, such as calipers, scales, dial indicators, gauges, and micrometers. Repairs and maintains sheet metal products. May operate computer-aided-drafting (CAD) equipment to develop scale drawings of product or system. May operate laser-beam cutter [Laser-Beam-Machine Operator (welding) 815.682-010] or plasma arc cutter [ARC CUTTER, PLASMA ARC (welding) 816.364-010] to cut patterns from sheet metal. May be designated by type of metal as Coppersmith (any industry); Tinsmith (any industry); or according to type of activity as Fabricator, Special Items (any industry); Model Maker, Sheet-Metal (any industry); Product-Development Worker (any industry); Roofer, Metal (construction); Sheet-Metal Installer (any industry); Sheet-Metal Worker, Maintenance (any industry); Shop Mechanic (any industry).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0510	ABCI Sheet Metal GNJ FL007900015	8000	Ruth Tirado	7	Broward
0510	All Florida Apprenticeship GNJ FL005081357	8000	Joanne Stewart	4	Brevard
0510	Brevard Air Conditioning Contractors Association, Inc. GNJ FL001970007	8000	Donna Tice	4	Brevard
0510	Florida East Coast Chapter AGC Sheet Metal Workers GNJ FL007890027	8000	Andrea Serraes	7	Palm Beach
0510	Florida Gulf Coast Chapter ABC,	8000	Lisa Boyette	4	Hillsborough

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	Inc. GNJ FL007720004				
0510	Ivey Mechanical Company, LLC INJ FL008030001	8000	Thomas Swafford	2	Duval
0510	Jacksonville Sheet Metal Workers JAC FL008460001	8000	George Richardson	2	Duval
0510	School Board of Broward County Florida Physical Plant Operations JJ FL007740006	8000	Steve Deery	7	Broward
0510	Sheet Metal Workers LU #32 JAC FL007470002	8000	William Wootten	7	Dade
0510	Sheet Metal Workers' Local 15 JATCTF FL007690001	8000	John Songer	4	Seminole
0510	South Florida Chapter, Associated General Contractors, Inc. GNJ FL007890025	8000	Izette Scott	7	Broward
0510	Tri-County Apprenticeship Academy GNJ FL004040001	8000	Christine Rodriguez	6	Lee
0510	West Palm Beach Sheet Metal JAC FL007490001	8000	Rick Pazos	7	Palm Beach

Tool-and-Die Maker

Analyzes specifications, lays out metal stock, sets up and operates machine tools, and fits and assembles parts to fabricate and repair metalworking dies, cutting tools, jigs and fixtures, gauges, and machinists' hand tools, applying knowledge of tool and die design and construction, shop mathematics, metal properties, and layout, machining, and assembly procedures. Studies specifications, such as blueprints, sketches, models, or descriptions, and visualizes product to determine materials required and machines to be used to fabricate parts. Computes dimensions, plans layout, and determines assembly method and sequence of operations. Measures, marks, and scribes metal stock for machining [Lay-Out Worker (machine shop) 600.281-018]. Sets up and operates machine tools, such as lathes, milling machine, shaper, and grinder, to machine parts, and verifies conformance of machined parts to specifications [Tool-Machine Set-Up Operator (machine shop) 601.280-054]. Lifts machined parts manually or using hoist, and positions and secures parts on surface plate or worktable, using devices, such as vises, V-blocks, and angle plates. Smooths flat and contoured surfaces, using scrapers, abrasive stones, and power grinders, and fits and assembles parts together and into assemblies and mechanisms, using hand tools. Verifies dimensions, alignments, and clearances, using measuring instruments, such as dial indicators, gauge blocks, thickness gauges, and micrometers. Heat-treats tools or parts [Heat Treater (heat treating) II 504.682-018]. May connect wiring and hydraulic lines to install electrical and hydraulic components. May examine standard or previously used dies, tools, and jigs and

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fixtures, and recommend design modifications regarding construction and function of part. May develop specifications from general descriptions for specialty tools and draw or sketch design of product. May specialize in repair work and be designated Tool-And-Die Repairer (machine shop).

Occ Code	Program Name	Program Hours	Sponsor	Region	District
0586	Manasota Manufacturing Technology GNJ FL004030001	8000	Tom Karr	6	Sarasota
0586	Tampa Bay Machining Apprenticeship GNJ FL007900006	8000	Richard McConnaughey	6	Pinellas

Industry Certification-based Articulation

The State Board of Education has approved the listed Statewide Career and Technical Education Articulation Agreements which are based on industry certification attainment. This supports the Department's Next Generation Areas of Focus effort Number 3 — "to expand opportunities for postsecondary degrees and certificates." These agreements are intended to be a minimum guarantee of articulated credit and do not preclude institutions from granting additional credit based on local agreements. The following are approved manufacturing related statewide articulation agreements based on industry certification attainment.

- Engineering Technology degree:
 - [MSSC Certified Production Technician \(MSSCN001\) to Engineering Technology](#)
 - [Autodesk Certified Professional - Inventor \(ADESK024\) to Engineering Technology](#)
- Electronics Engineering Technology degree:
 - [MSSC Certified Production Technician \(MSSCN001\) to Electronics Engineering Technology](#)
 - [Associate Level Certified Electronic Technician \(ISCET001\) to Electronic Engineering Technology](#)
 - [Electronics Systems Associate \(ISCET002\) to Electronics Engineering Technology](#)
- Manufacturing Technology degree:
 - [MSSC Certified Production Technician \(MSSCN001\) to Manufacturing Technology](#)
- Drafting and Design Technology degree:
 - [ADDA Drafter Certification \(AMDDA001\) to Drafting and Design Technology](#)
 - [Autodesk Certified Associate - AutoCAD \(ADESK016\) to Drafting and Design Technology](#)
 - [Autodesk Certified Professional - AutoCAD \(ADESK021\) to Drafting and Design Technology](#)
 - [Autodesk Certified Associate - AutoCAD Architecture \(ADESK017\) to Drafting and Design Technology](#)
- Supply Chain Management degree:
 - [Global Logistics Associate \(AMSTL003\) to Supply Chain Management](#)

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Corporate/Customized Training

Understanding that incumbents as well as displaced workers need skills as relevant and modern as the methods and materials used in manufacturing today, short term training programs have been created. These programs are offered by continuing education and corporate college division of both community/state colleges and universities, private training providers, Florida MEP, and in-house within industry. Currently the only industry certification aligned training programs are those utilizing the Banner Center's materials for the MSSC CPT certification.

The Banner Center for Advanced Manufacturing created curricula targeting both incumbents and the unemployed. "Manufacturing Fundamentals" is a 120 contact-hour course for entry-level trainees, "Manufacturing Essentials" is a 80 contact-hour course for incumbent workers. All of these trainees, gain relevant skills and knowledge that open the door to employment or advancement within their organizations and provide them the pathway to college credit via industry certification-based articulation into the Engineering Technology degree. Beyond the MSSC CPT competencies, corporate training providers address higher level automation, electromechanical, and maintenance training through customized courses aligned with Rockwell Automation's certificates and competencies defined by the employer. This has resulted in an employer driven system that addresses the workforce skills gap that can be deployed quickly and flexibly

- **Manufacturing Fundamentals:** a 120-contact hour, 5-Unit program for the entry-level production worker, which aligns with the Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) Certification.
- **Manufacturing Essentials:** an 80-contact hour, 5-Unit program for the incumbent production worker, which aligns with MSSC CPT Certification.
- **CPT Instructor Certification Course:** A two-day short course designed to prepare faculty and trainers to use the Center's *Manufacturing Fundamentals* and/or *Manufacturing Essentials* curricula and earn their MSSC CPT certification.

Because supply chain management has become increasingly important to manufacturing enterprises, the Banner Centers for Advanced Manufacturing and Global Logistics have partnered to develop training programs. These programs are just entering the marketplace.

- **Supply Chain Management (SCM):** an 80-contact hour, 7-Unit modular program for entry-level supply chain occupations. The curricula align with both the American Society of Transportation and Logistics' (AST&L) Global Logistics Associate (GLA) and the MSSC Certified Logistics Associate (CLA) and Certified Logistics Technician (CLT) certifications.
- **SCM Instructor Certification Course:** A two-day short course designed to prepare faculty and trainers to use the SCM curricula and earn their AST&L GLA or MSSC CLA/CLT certification.

Private Sector Assets

Florida is rich with manufacturing associations and national manufacturing associations that have a presence in the state. They are:

Manufacturers Association of Florida (MAF)
Bay Area Manufacturers Association (BAMA)
Capital Region Manufacturers (CRM)
First Coast Manufacturers Association (FCMA)
Manufacturers Association of Central Florida (MACF)
Marion Region Manufacturers Association (MRMA)
North Central Florida Advanced Manufacturers Association (NCFAMA)
Sarasota-Manatee Area Manufacturers Association (SAMA)
South Florida Manufacturers Association (SFMA)
Southwest Regional Manufacturers Association (SRMA)
Upper Tampa Bay Manufacturers Association
Volusia Manufacturers Association (VMA)

In addition, there are several membership chapters of SME and APICS in the state. These Manufacturers Associations are all focused on helping their manufacturers to be competitive and workforce development is a critical factor. Implementing skills certification will be an asset to their efforts.

Florida has a Manufacturing Extension Programs funded by NIST in the U.S. Department of Commerce, Florida MEP located in Celebration, that serves companies throughout the state, principally via its MOST program and Lean training from TimeWise.

Appendix 1

Engineering Technology and Related Program Enrollment & Completion

Annually, the FLATE Center at Hillsborough Community College analysis enrollment and completion data for manufacturing related programs from the Florida Department of Education Community Colleges and Technical Center Management and Information System (CCTCMIS). The data specifically was sources from the CCTCMIS WDIS and Survey 5, post-secondary and secondary vocational databases.



2005-2010 Florida Engineering Technology and Related Program Enrollment and Completion

FLATE, a National Science Foundation Regional Center of excellence, annually compiles enrollment and completion data for the Engineering Technology (ET) and related degree and college credit certificate (CCC) programs for Florida colleges, and for related programs at the PSAV and secondary level. These data, provided by the Florida Department of Education, are reliable, but do not include enrollments for undeclared majors. College Registrar reporting/cut dates also result in reported enrollment discrepancies. Minor anomalies may occur as older program titles are collapsed and new program titles are added. This review contains seven sections:

- I. Total Engineering Technology and Related Program Enrollment: AA/AAS and Certificates
- II. Engineering Technology and related College Degree Enrollment and Completion by Program
- III. Engineering Technology and related College Credit Certificate Enrollment and Completion by Program
- IV. Ethnicity Analysis of Enrollment and Completers for ET and Related College Programs
- V. Secondary Level Technology Enrollment by Program
- VI. Post-Secondary Adult Vocational (PSAV) Enrollments, OCP, and Completions
- VII. Total Secondary Level Technology Program Enrollment, Demographics, Internships, and Completion

I. Total Engineering Technology and Related Program Enrollment: AA/AAS and Certificates	2005-06	2006-07	2007-08	2008-09	2009-10
	5,398	4,956	4,513	4,636	5,095
Total AA/AAS & Certificate Enrollment at 9 colleges which have adopted the ET Degree					2,287
Representative percentage of enrollment by ET adopters for the 5,095 Total Enrollment among all 24 colleges offering ET and related programs					45%

II. Engineering Technology and related College Degree Enrollment and Completion by Program					
() Indicates Number of Schools Currently Offering A.S./A.A.S. Degrees	2005-06	2006-07	2007-08	2008-09	2009-10
(10) Engineering Technology (ET) Degree Enrollment *				145	347
* FLDOE does not provide enrollment by specialization					
(1) Aerospace Technology	76	80	90	89	86
(5) Biomedical Engineering Technology	323	322	261	239	365
(2) Chemical Technology	165	192	206	342	547
(3) Computer Integrated Manufacturing	115	132	96	73	59
(18) Drafting & Design Technology	1780	1618	1482	1286	1207
(18) Electronics Engineering Technology	1569	1406	1053	1152	1271
(14) Industrial Management Technology	998	703	690	694	761
(5) Manufacturing Technology	121	99	70	62	33
(1) Simulation and Robotics Technology			50	48	38
Total Degree Enrollment /ET and Related	5,147	4,552	3,998	4,130	4,714

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A.S./A.A.S. Degree Completion	2005-06	2006-07	2007-08	2008-09	2009-10
Aerospace Technology	21	10	6	15	11
Biomedical Engineering Technology	17	28	24	23	30
Chemical Technology	12	9	17	13	19
Computer Integrated Manufacturing	3	28	7	8	6
Drafting & Design Technology	119	107	110	121	124
Electronics Engineering Technology	90	86	65	117	93
Engineering Technology				7	14
Industrial Management Technology	231	192	239	222	237
Manufacturing Technology	1	7	1	4	3
Simulation Technology			2	1	1
Total College Completion	494	467	471	531	538

III. Engineering Technology and related Certificate Enrollment and Completion by Program

() Indicates the number of schools currently offering the certificate

Certificate Enrollment by Program	2005-06	2006-07	2007-08	2008-09	2009-10
(1) CCC - Applied Technology Specialist			46	36	13
(1) CCC - Automation					2
(1) CCC - CNC Machinist			1	2	5
(1) CCC - Computerized Woodworking				1	0
(2) CCC - Engineering Support Specialist			9	22	20
(1) CCC - Lean Manufacturing					20
(1) CCC - Lean Six Sigma Green Belt			25	16	12
(1) CCC - Six Sigma Black Belt			22	13	5
Total Engineering Technology Enrollment			103	90	77
(13) CCC - AutoCAD Foundations	246	395	337	328	245
(3) CCC - Basic Electronics Technician			44	55	28
(2) CCC - Chemical Laboratory Specialist	5	9	7	6	15
(2) CCC - Electronics Technician			11	21	13
(2) CCC - Laser And Photonics Technician			13	6	3
Total Enrollment /ET and Related	251	404	515	506	381

Certificate Completion by Program	2005-06	2006-07	2007-08	2008-09	2009-10
CCC - Applied Technology Specialist			25	21	22
CCC - AutoCAD Foundations					161
CCC - Automation					2
CCC - Basic Electronics Technician			92	52	24
CCC - Chemical Laboratory Specialist	2	5	2	2	6
CCC - CNC Machinist			1	2	7



Certificate Completion by Program continued	2005-06	2006-07	2007-08	2008-09	2009-10
CCC - Computerized Woodworking					1
CCC - Electronics Aide					9
CCC - Electronics Technician				26	8
CCC - Engineering Support Specialist			5	36	36
CCC - Laser And Photonics Technician			8	3	2
CCC - Lean Manufacturing					20
CCC - Lean Six Sigma Green Belt			26	33	24
CCC - Six Sigma Black Belt			33	27	22
CCC - Scientific Workplace Prep					11
Total Certificate Completion	2	5	192	202	355

IV. Ethnicity Analysis of Enrollment and Completers for ET and Related College Programs *					
ET and Related College Degree and Certificate Programs	2009-10 Enrollments	2009-10 Enrollments % of Total	2009-10 Completers	2009-10 Completers % of Total	Completion Rate by Ethnicity
Black	831	16%	73	14%	9%
Hispanic	824	16%	59	11%	7%
White	3030	59%	357	66%	12%
Asian/Pacific Islander	132	3%	15	3%	11%
American Indian/Alaska Native	33	1%	5	1%	15%
Unreported Ethnicity	245	5%	29	5%	12%
Total Enrollment/Completions	5095	100%	538	100%	11%

*New measurement and tracking by FLATE beginning 2009-10 Report Year

V. Secondary Level Technology Enrollment by Program					
Program Title	2005-06	2006-07	2007-08	2008-09	2009-10
Automation & Production Technology*					37
Electronics Technology	1,095	692	675	626	603
Engineering Assisting	312	315	347	291	351
Engineering Technology	5,764	6,139	8,134	8,522	6,853
Industrial Biotechnology				229	285
Industrial Machinery Maintenance	7	35	204	164	22
Materials and Processes Technology	4,635	5,576	4,661	4,602	3,942
Production Technology	2,700	2,093	1,868	1,717	1,584
Technology Systems	2,859	2,731	2,222	1,902	915
Total Enrollment by Program	17,372	17,581	18,111	18,053	14,592

* New program adopted by FLDOE in 2010

VI. Post-Secondary Adult Vocational (PSAV) Enrollments, OCP, and Completions					
PSAV FLDOE Report Categories	2005-06	2006-07	2007-08	2008-09	2009-10
Enrollment	563	346	425	371	359
OCP Earners	333	290	414	333	340
Completions	58	37	34	33	43
Number of Programs	24	18	15	5	5
Number of Participating Institutions	15	11	8	9	12

Current programs offered are: Electromechanical Technology, Electrical and Instrumentation Technology Industrial Machinery Maintenance, Industrial Technology, and Machining.

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VII. Total Secondary Level Technology Program Enrollment, Demographics, Internships, and Completion					
Secondary FLDOE Report Categories	2005-06	2006-07	2007-08	2008-09	2009-10
Number of Programs Offered	562	521	548	541	380
Total Enrollment	17,372	17,581	18,111	18,053	14,592
Male	14,942	14,625	15,291	15,050	12,183
Female	2,430	2,956	2,820	3,003	2,409
Students self reporting as white	10,378	9,418	9,552	9,297	7,097
Students not self reporting as white	6,994	8,163	8,559	8,756	7,495
Total Internships	1,752	1,951	288	229	262
Males Placed in Internships	1,358	1,478	238	174	182
Females Placed in Internships	394	473	50	55	80
Total Graduates	2,137	3,079	3,114	3,042	2,732
Male Graduates	1,806	2,515	2,530	2,472	2,231
Female Graduates	331	564	584	570	501
Graduates self reporting as white	1,498	1,653	1,645	1,471	1,306
Graduates not self reporting as white	639	1,426	1,469	1,571	1,426

Notes:

In 2010 FLATE was notified that the FLDOE had made the decision not to provide enrollment and completion data for each ET specialization

FLDOE is unable to provide long-term tracking and cross-referencing with the FETPIP employment records at this time.

FLDOE is unable to provide MSSC cross-referencing at this time