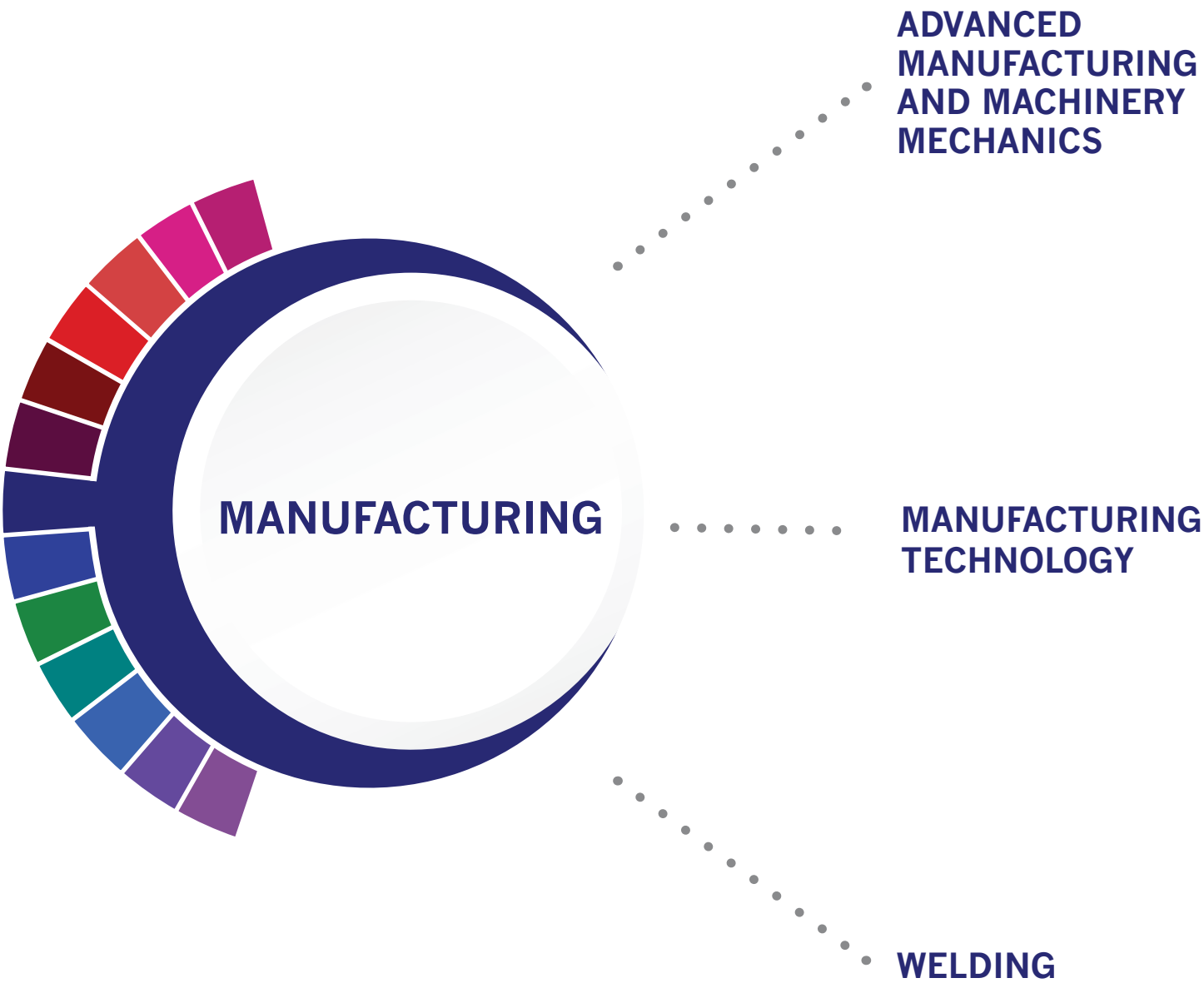

Local Implementation Considerations:

Students completing two or more courses for two or more credits within a program of study earn concentrator status for Perkins V federal accountability reporting.

Proposed Indicator: Students finishing three or more courses for four or more credits with one course from level 3 or 4 within a program of study earn completer status for federal accountability reporting.

Texas Education Agency

ADVANCED MANUFACTURING AND MACHINERY MECHANICS

MANUFACTURING

COURSES

LEVEL 1
- Principles of Manufacturing
- Occupational Safety and Environmental Technology I
- Principles of Applied Engineering

LEVEL 2
- Engineering Design and Presentation I
- Occupational Safety and Environmental Technology II
- Robotics I
- Manufacturing Engineering Technology I
- Programmable Logic Controller I (TBD)

LEVEL 3
- Manufacturing Engineering Technology II
- Robotics II
- Programmable Logic Controller II (TBD)

LEVEL 4
- Practicum in Manufacturing
- Practicum in Entrepreneurship (TBD)
- Career Preparation I

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
FANUC Robot Operator 1	Engineer, Professional	Electro- mechanical Engineering/ Technology	Electrical Engineering	
Mastercam Associate Level Certification	PMMI Mechatronics: Programmable Logic Controllers 1	Robotics Technology/ Technician	Engineering, General	
NCCER Industrial Maintenance Mechanic	Certified Quality Technician	Instrumentation Technology/ Technician	Industrial Engineering	
NIMS Industrial Technology Maintenance - Maintenance Operations	Plant Maintenance Technologist	Industrial Mechanics and Maintenance Technology	Mechanical Engineering	

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Electro-Mechanical Assemblers	$30,160	951	9%
Electro-Mechanical Technicians	$56,555	127	9%
Industrial Machinery Mechanics	$49,816	3,788	27%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Participate in SkillsUSA and local STEM events

Work Based Learning Activities:
Apprenticeship at a local business or industry
American Welding Society

The Advanced Manufacturing and Machinery Mechanics program of study focuses on the assembly, operation, maintenance, and repair of electromechanical equipment or devices. Students may work in a variety of mechanical fields, gaining knowledge and experience in robotics, refinery and pipeline systems, deep ocean exploration, or hazardous waste removal. CTE concentrators may work in a variety of fields of engineering.

The Manufacturing Career Cluster® focuses on planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering.

Successful completion of the Advanced Manufacturing and Machinery Mechanics program of study will fulfill requirements of the Business and Industry Endorsement.

Approved Statewide Program of Study - September 2019

Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ)	GRADE
Principles of Manufacturing	13032200 (1 credit)	None	9-12
Occupational Safety and Environmental Technology I	N1303680 (1 credit)	None	9-12
Principles of Applied Engineering	13036200 (1 credit)	None	9-10
Engineering Design and Presentation I	13036500 (1 credit)	PREQ: Algebra I	10-12
Occupational Safety and Environmental Technology II	N1303681 (1 credit)	None	9-12
Manufacturing Engineering Technology I	13032900 (1 credit)	None	10-12
Robotics I	13037000 (1 credit)	None	9-10
Programmable Logic Controller I	TBD	TBD	TBD
Manufacturing Engineering Technology II	13032950 (1 credit)	PREQ: Manufacturing Engineering Technology I	11-12
Robotics II	13037050 (1 credit)	PREQ: Robotics I	10-12
Practicum in Manufacturing	13033000 (2 credits) 13033005 (3 credits) 13033010 (2 credits) 13033015 (3 credits)	None	12
Programmable Logic Controller II	TBD	TBD	TBD
Practicum in Entrepreneurship	TBD	TBD	TBD
Career Preparation I	12701300 (2 credits) 12701305 (3 credits)	None	11-12

FOR ADDITIONAL INFORMATION ON THE MANUFACTURING CAREER CLUSTER, PLEASE CONTACT:

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https://tea.texas.gov/cte

COURSES

LEVEL 1
- Blueprint Reading for Manufacturing Applications
- Principles of Manufacturing
- Occupational Safety and Environmental Technology I
- Principles of Applied Engineering

LEVEL 2
- Metal Fabrication and Machining I
- Diversified Manufacturing I
- Occupational Safety and Environmental Technology II

LEVEL 3
- Precision Metal Manufacturing I
- Metal Fabrication and Machining II
- Diversified Manufacturing II
- Occupational Safety and Environmental Technology III
- Computer Integrated Manufacturing (PLTW)

LEVEL 4
- Precision in Metal Manufacturing II/Lab
- Practicum in Manufacturing
- Practicum in Entrepreneurship (TBD)

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
MSSC Certified Production Technician	Certified Welder or Welder Inspector	Welding Technology/ Welder	Welding Engineering Technology/ Technician	
ISCET Associate-Level Certified Electronics Technician	Machining Level 1 - CNC Milling: Programming Setup & Operations	Machine Shop Technology/ Assistant	Biomedical Technology/ Technician	Occupational Health and Industrial Hygiene
Mastercam Professional Level Certification	Certified Welding Engineering	Operations Management and Supervision		
NIMS Industrial Technology Maintenance - Basic Mechanical Systems	Certified Environmental, Safety, and Health Trainer	Occupational Safety and Health Technology/ Technician	Environmental Health	

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Mechanical Engineering Technicians	$57,117	453	9%
Production and Operating Technicians	$62,171	5,094	9%
CNC Machine Programmers	$54,891	222	13%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Participate and compete in SkillsUSA
Job shadow a machinist

Work Based Learning Activities:
Apprenticeship at a local business or industry
American Welding Society

The Manufacturing Technology program of study focuses on the development and use of automatic and computer-controlled machines, tools, and robots that perform work on metal or plastic. Students will learn how to set up and operate a variety of machine tools to produce precision parts and instruments. Students will also learn how to modify parts to make or repair machine tools or maintain individual machines, and how to use hand-welding or flame-cutting equipment.

The Manufacturing Career Cluster® focuses on planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering.

Successful completion of the Manufacturing Technology program of study will fulfill requirements of the Business and Industry Endorsement.

Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ)	GRADE
Blueprint Reading for Manufacturing Applications	N1303684 (1 credit)	None	10-12
Principles of Manufacturing	13032200 (1 credit)	None	9-12
Occupational Safety and Environmental Technology I	N1303680 (1 credit)	None	9-12
Principles of Applied Engineering	13036200 (1 credit)	None	9-10
Metal Fabrication and Machining I	13032700 (2 credits)	None	10-12
Diversified Manufacturing I	13032650 (1 credit)	None	10-12
Occupational Safety and Environmental Technology II	N1303681 (1 credit)	None	9-12
Precision Metal Manufacturing I	13032500 (2 credits)	None	10-12
Metal Fabrication and Machining II	13032800 (2 credits)	PREQ: Metal Fabrication and Machining I	11-12
Diversified Manufacturing II	13032660 (1 credit)	PREQ: Diversified Manufacturing I RPREQ: Algebra I	11-12
Occupational Safety and Environmental Technology III	N1303682 (2 credits)	PREQ: OSET I and II	11-12
Computer Integrated Manufacturing (PLTW)	N1303748 (1 credit)	PREQ: Precision Metal Manufacturing I	11-12
Precision Metal Manufacturing II/Lab	13032600 (2 credits) 13032610 (3 credits)	None	11-12
Practicum in Manufacturing	13033000 (2 credits) 13033005 (3 credits) 13033010 (2 credits) 13033015 (3 credits)	None	12
Practicum in Entrepreneurship	TBD	TBD	TBD

FOR ADDITIONAL INFORMATION ON THE MANUFACTURING CAREER CLUSTER, PLEASE CONTACT:

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COURSES

LEVEL 1
Introduction to Welding

LEVEL 2
Welding I

LEVEL 3
Welding II/Lab

LEVEL 4
Practicum in Manufacturing
Practicum in Entrepreneurship (TBD)
Career Preparation I

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
AWS Certified Welder, D1.1, D9.1	Certified Welder or Welder Inspector	Welding Technology/ Welder	Welding Engineering Technology/ Technician	
ASW SENSE Level 1	Machining Level 1 - CNC Milling: Programming Setup & Operations	Machine Shop Technology/ Assistant	Biomedical Technology/ Technician	Occupational Health and Industrial Hygiene
API 1104 Welding Certificate	Certified Welding Engineering	Operations Management and Supervision		
NCCER Welding, Level 1	Certified Environmental, Safety, and Health Trainer	Occupational Safety and Health Technology/ Technician	Environmental Health	

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Welders, Cutters, Solderers, and Brazers	$41,350	6,171	9%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Participate and compete in SkillsUSA
Job shadow a machinist

Work Based Learning Activities:
Apprenticeship at a local business or industry
American Welding Society

The Welding program of study focuses on the development and use of automatic and computer-controlled machines, tools, and robots that perform work on metal or plastic. Students will learn how to modify parts to make or repair machine tools or maintain individual machines, and how to use hand-welding or flame-cutting equipment.

The Manufacturing Career Cluster® focuses focuses on planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering.

Successful completion of the Manufacturing Technology program of study will fulfill requirements of the Business and Industry Endorsement.

Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ)	GRADE
Introduction to Welding	13032250 (1 credit)	None	9-12
Welding I	13032300 (2 credit)	None	10-12
Welding II/Lab	13032400 (2 credits) 13032410 (3 credits)	PREQ: Welding I	11-12
Practicum in Manufacturing	13033000 (2 credits) 13033005 (3 credits) 13033010 (2 credits) 13033015 (3 credits)	None	12
Practicum in Entrepreneurship	TBD	TBD	TBD
Career Preparation I	12701300 (2 credits) 12701305 (3 credits)	None	11-12

FOR ADDITIONAL INFORMATION ON THE MANUFACTURING CAREER CLUSTER, PLEASE CONTACT:

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