

Manufacturing Cluster

Production Pathway –

Advanced CNC Machinist – This major prepares students as advanced CNC machinists who set up, program and operate computer numerical control (CNC) machine tools such as lathes, milling machines, and machining centers to produce precision metal or plastic parts. Students are instructed in machine tool fundamentals and safe applications along with advanced print reading and precision measurement, and computer repair/troubleshooting. Also included are complex computer numerical control setup, programming, and production applications of lathes, mills and turning centers. Lab work is a required component of this major.

Advanced Manual Machinist – This major prepares students as advanced manual machinists who create metal or plastic parts on manual machines such as lathes, milling machines and surface grinders. Students are instructed in advanced machine tool theory, fundamentals, and safe practices along with advanced print reading and precision measurement applications. Also included are setup and operation of milling machine and engine lathes. Lab work is a required component of this major.

Assembler Technician – This program prepares students for employment in the manufacturing / fabrication industry with an emphasis on assembly.

Automation Technician Assistant – This major prepares students as automation technician assistants who assist in installing and maintaining electrical and automated production systems. Students are instructed in general manufacturing and plant safety rules and regulations, electrical theory, and principles of industrial electricity and industrial electronics along with maintenance, troubleshooting and repair of electromechanical/digital devices and circuits. Also included are troubleshooting and repairing power semiconductors as well as programmable controller programming. Laboratory experience is an integral part of this major.

CADD/CAM Mechanical Specialist – This major prepares students as CADD/CAM mechanical specialists who are responsible for mechanical system design, drafting and layout or for advancing to a college or university to complete a higher degree. Students learn to convert ideas and specifications of the mechanical engineer into working drawings by utilizing both manual sketching and parametric solid modeling methods that meet ANSI (American National Standards Institute) and /or AIA (American Institute of Architecture) drafting standards. Instruction includes engineering software and advanced mechanical design, using project-based lab components, along with a manufacturing CAM course where students design and manufacture products using computer assisted machine tools.

CNC Machinist – This major prepares students as CNC machinists who make precision metal or plastic parts utilizing computer programming for CNC machines like lathes, milling machines and machining centers. Students are instructed in machine tool theory, fundamentals and safe applications along with print reading, metal preparation and precision measurement. Also included are principles and proper techniques of precision grinding, engine lathe and milling machine operations as well as computer numerical control (CNC) setup, programming, and

production applications of lathes, surface grinders and milling machines. Lab work is a required component of this major.

CNC Machinist Assistant – This major prepares students to use CNC machines that have been set up and programmed by the CNC machinist to make precision metal or plastic parts. Students are instructed in machine tool theory, fundamentals and safe applications along with print reading, metal preparation and precision measurement. Also included are principles and proper techniques of precision grinding, engine lathe and milling machine operations as well as basic computer numerical control (CNC) setup and programming skills. Lab work is a required component of this major.

CNC Manufacturing Technician – This major prepares students as CNC manufacturing technicians who design, develop, construct and implement manufacturing equipment and production systems and/or assist design engineers in this capacity. Students are instructed in manufacturing fundamentals, safety rules and regulations, and print reading along with metal preparation, precision measurement, and principles and proper techniques of precision grinding. Also included are computer numerical control (CNC) setup, programming and production applications of lathes and milling machines using computer-aided machining (CAM) principles and computer-aided drafting (CAD) applications. Lab work is a required component of this major.

CNC Precision Machining Technician - This career major will introduce students to the skills, safety procedures, operations of tools and equipment related to the operations of a CNC in the precision machining industry.

CNC/CAM Technician – This major prepares students as CNC/CAM technicians who set up, program, troubleshoot and repair computerized machines in a manufacturing environment or for advancing to a college or university to complete a higher degree. Students learn to convert ideas and specifications of the mechanical engineer into working drawings by utilizing both manual sketching and parametric solid modeling methods that meet ANSI (American National Standards Institute) and /or AIA (American Institute of Architecture) drafting standards. Instruction includes advanced mechanical design using project-based lab components, programming and production applications of lathes and milling machines using computer-aided machining (CAM) principles, and a manufacturing CAM course where students design and manufacture products using computer-assisted machine tools.

Drill Press Operator – This major prepares students as drill press operators who operate previously set up drilling machines to produce metal or non-metal work pieces. Students learn machine tool theory, print reading for machining, and precision measurement as well as setup and operation of engine lathes. Lab work is an integral part of this major.

Electronics Assembler – This major prepares students as electronics assemblers who read engineering drawings and electronic schematics to assemble electronic products. Students learn electrical safety, proper use and maintenance of hand and power tools, and precision measurements for electronics technicians. Included are proper selection of connection

techniques and connectors and fasteners used in constructing electronic circuits and devices along with the troubleshooting, repair and maintenance of electromechanical devices.

Engine Lathe Operational Technician – This major prepares students as engine lathe operators who set up and/or operate lathes to perform machining operations, such as turning, boring, threading and facing on metallic or nonmetallic work pieces according to specifications. Students are instructed in advanced machine tool theory, fundamentals, and safe applications along with advanced print reading and precision measurement. Also included are engine lathe setup and turning, facing and boring operations. Lab work is a required component of this major.

Engine Lathe Operator – This major prepares students as engine lathe operators who set up and/or operate lathes to perform machining operations, such as turning, boring, threading and facing on metallic or nonmetallic work pieces according to specifications. Students are instructed in machine tool theory, fundamentals and safe applications along with print reading, precision measurement, and principles and proper techniques of engine lathe operations. Lab work is a required component of this major.

Grinder Operational Technician – This major prepares students as grinder operators who set up and operate surface grinding machines to grind flat or contoured surfaces of metal work pieces, such as tool, die and machine parts. Students are instructed in advanced machine tool theory, fundamentals and safe practices. Instruction includes precision tools and measurement and advanced printing reading for machining along with principles, proper setup, and operation of precision grinding equipment. Lab work is a required component of this major.

Grinder Operator – This major prepares students as grinder operators who set up and operate surface grinding machines to grind flat or contoured surfaces of metal work pieces, such as tool, die and machine parts. Students are instructed in machine tool theory, fundamentals and safe practices. Instruction includes precision tools and measurement applications along with principles and proper techniques of precision grinding. Lab work is a required component of this major.

Manual Machinist – This major prepares students as manual machinists who create metal or plastic parts running manual machines such as lathes, milling machines and surface grinders. Students are instructed in machine tool theory, fundamentals and safe practices along with print reading and precision measurement applications. Also included are principles and techniques of milling machine and engine lathe work. Lab work is a required component of this major.

Manufacturing Production Machinist - This major prepares students as production machinists who design, develop and produce parts for various projects and applications. Instruction will include precision measurement, machine tool theory, print reading, lathe and milling operations and manufacturing fundamentals. CNC setup, programming and production, as well as computer-aided drafting and computer aided machining (CAD/CAM) principles and usage will also be taught.

Manufacturing Specialist – CNC Machinist Assistant – This major prepares students to use CNC machines that have been set up and programmed by the CNC machinist to make precision metal or plastic parts in diverse manufacturing environments. Students receive an overview of safe operation of manufacturing equipment in the areas of precision metal fabrication, welding, machine tool, CNC, computer aided drafting, and pre-engineering. Also included are print reading, precision measurement, and proper techniques of precision grinding, engine lathe and milling machine operations as well as computer numerical control (CNC) setup and programming skills. Lab work is a required component of this major.

Manufacturing Specialist – Engine Lathe Operator – This major prepares students as engine lathe operators who set up and/or operate lathes in diverse manufacturing environments to perform machining operations, such as turning, boring and facing on metallic or nonmetallic work pieces according to specifications. Students receive an overview of safe operation of manufacturing equipment in the areas of precision metal fabrication, welding, machine tool, CNC, computer aided drafting, and pre-engineering. Also included are machine tool theory, fundamentals, and safe applications along with print reading, precision measurement, and proper techniques of engine lathe operations. Lab work is a required component of this major.

Manufacturing Technician - This career major prepares students to work as an entry-level manufacturing technician. A manufacturing technician performs setups and machine operations with minimal supervision with on a variety of manual or semi-manual machines. Technicians are required to operate machines to produce quality parts for a manufacturing company within a specified time frame. The technician will perform quality checks to insure parts meet print specifications and meet or exceeds customer's expectations.

Milling Machine Operational Technician – This major prepares students as milling machine operators who set up and operate milling, drilling, boring or grinding machines. Students are instructed in advanced machine tool theory, fundamentals, and safe practices along with advanced print reading and precision measurement. Also included are setup and operation of horizontal, vertical and universal milling machines. Lab work is a required component of this major.

Milling Machine Operator – This major prepares students as milling machine operators who operate milling, drilling, boring or grinding machines. Students are instructed in machine tool theory, fundamentals and safe practices along with print reading and precision measurement applications. Also included are principles and techniques of milling machine work. Lab work is a required component of this major.

NIMS Certified Machine Operator (Entry Level) - This career major is aligned with the highly recognized National Institute for Metalworking Skills (NIMS) and prepares students to successfully pass several of the NIMS Level One certification tests. Manual Machining skills learned in this career major include; basics of hand tools, job planning, benchwork, layout operations, drill press, and milling and lathe processes. CNC skills that will be obtained include; CNC lathe and CNC mill operations. Upon completion students are prepared to enter the machining industry as entry level Manual Machinists or CNC Machine operators.

NIMS Certified Machine Technician - This career major is aligned with the highly recognized National Institute for Metalworking Skills (NIMS) and prepares students to successfully pass several of the NIMS Level One certification tests. Manual Machining skills learned in this career major include; basics of hand tools, job planning, benchwork, layout operations, drill press, milling and lathe processes. CNC skills that will be obtained include; CNC setup and programming, CNC lathe and mill operations, and CNC Basic CAM programming. Upon completion, students are prepared to enter the machining industry as entry level Manual Machinists or CNC Machinists.

Production Workforce Transition – This major will be used for all Individualized Cooperative Education (ICE) programs to build their training outline. Students will focus on employability skills while receiving hands-on experience in the production part of manufacturing. Included is a work-site experience (WSE) where students develop proficiency skills unique to a given occupation along with a formal mentoring program designed to accelerate an individual student's skill development.

Production, Manufacturing, and Quality Control Specialist - This program prepare students for employment in the Manufacturing/Fabrication industry with an emphasis on assembly, quality assurance and production.

TechConnect Manufacturing Experience – This major is designed for 11th or 12th grade students when access to advanced career majors is not available or special needs are identified. Curriculum includes fundamental applications of mechanical drafting, metal fabrication, fluid power installation and repair, precision machining, sheet metal, and welding. Students will work under the supervision of experienced instructors in preparation for entry-level positions in the workplace.