

Wisconsin Technical College System Curriculum Standards Model & Program Design Summary

50-420-9 INDUSTRIAL MANUFACTURING TECHNICIAN APPRENTICE

Program Information

Program Description

Entry level industrial manufacturing technicians operate industrial production related equipment, work with manufacturing related tools, and perform work processes related to a wide variety of manufacturing settings. Industrial manufacturing technician apprentices will learn to set up, operate, monitor, and control production equipment. They will also help improve manufacturing processes and schedules to meet customer requirements. This apprenticeship training program combines on-the-job learning with related instruction in a classroom to prepare apprentices for journey level work after they complete the program.

Industry competency models outline skill sets and competencies that are essential to educate and train a globally competitive workforce. Entry-level critical work functions include:

1. Understand the various manufacturing types, processes, and products.
2. Understand the manufacturing business as a system that integrates multiple disciplines, processes, and stakeholders.
3. Manage raw materials/consumables.
4. Operate and control production equipment.

External Requirements

- 18 month apprenticeship following a hybrid apprenticeship model and format
- 264 hours of Related Instruction
- 2,736 hours of on-the-job learning
- BAS Transition-to-Trainer course at the end of the apprenticeship (8 hours are included)
- Forklift certification as needed by specific employers
- OSHA 10 safety certification
- First Aid and CPR certification
- Registered Apprentice with Wisconsin Bureau of Apprenticeship Standards

Entry Requirements

- High school diploma or equivalent
- Employer sponsorship & Wisconsin BAS signed contract
- Able to perform assigned job duties and tasks
- Mechanical ability and aptitude as determined by employer assessment practices

Program Outcomes

- 1 Protect self and other workers from accidents and injuries
- 2 Interpret technical information
- 3 Measure work
- 4 Inspect work
- 5 Use mechanical tools and testing equipment
- 6 Set-up production equipment
- 7 Operate production equipment

- 8 Produce quality product
- 9 Be aware of inventory and material processes
- 10 Be aware of routine equipment maintenance
- 11 Be aware of trends and the current state of the business
- 12 Apply soft skills to production and manufacturing work processes
- 13 Demonstrate continuous improvement

Program Configurations

50-420-9 Industrial Manufacturing Technician Apprenticeship Related Instruction

The program configuration model for the Industrial Manufacturing Technician Apprenticeship Related Instruction program provides two semesters of coursework and the Transition-to-Trainer course in the last year of the apprenticeship. Courses listed here include math and communication courses to compliment the core courses. Core courses align with the MSSC curriculum and modules. Each semester includes 128 hours of instruction (8 hours per week at 16 weeks per term).

Credits & Hours

Total Credits = 8.00

Total Hours = 264 (includes Transition to Trainer at 8 hours)

Term 1

Course #	Course Title	Credits & Hours	Course Description
50-420-510	Industrial Manufacturing Technician Apprentice 1	3.00 96 hours	The first semester of related instruction includes an orientation to the trade and manufacturing, then followed by the MSSC safety module, MSSC quality module, OSHA 10 certification, blueprint reading, visual inspection, measurement and first aid & CPR training. Manufacturing concepts will be introduced and applied in a variety of manufacturing settings. MSSC modules 1 and 2 are aligned with the learning plans for this course along with the MATC course Machine Trades Math.
50-420-711	Mathematics for the Machine Trades	1.00 32 hours	This course provides applied mathematics instruction from a review of basic arithmetic; basic algebra; applications, based on geometry; right triangle trigonometry, oblique angle trigonometry and compound angles. This course was formerly module 1 in related instruction.

Term 2

Course #	Course Title	Credits & Hours	Course Description
50-420-512	Industrial Manufacturing Technician Apprentice 2	3.00 96 hours	The second semester of related instruction includes the MSSC manufacturing processes and production and maintenance awareness modules, along with communication, lean manufacturing, problem solving, and frontline leadership. Manufacturing related concepts will be applied to a variety of industrial setting. The course wraps-up with an examination of emerging trends

			and technologies, and future directions for manufacturing. MSSC learning objectives in modules 3 and 4 are aligned with the learning plans for this course. In addition, the MATC Communication for Apprentices course is included in the learning plans but will stand alone for registration and transcript purposes.
50-420-712	Communications for Apprentices	1.00 32 hours	Introduces the apprentice to basic communication concepts relating to the workplace. It is designed specifically for the apprentice to acquire the necessary skills of giving instructions, writing a technical memo, and explaining a technical process. Throughout the course the apprentice will brainstorm, write, edit, revise, and use one-on-one communication delivery in a small group. The course combines lecture and hands-on activities utilizing information which the apprentice brings from the workplace.

Term - Last

Course #	Course Title	Credits & Hours	Course Description
47-455-455	Transition to Trainer: Your Role as a Journey Worker	0.00 8 hours	<p>Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade.</p> <p>You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job.</p>

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50-420-711 Mathematics for the Machine Trades

Course Outcome Summary

Course Information

Description This course provides applied mathematics instruction from a review of basic arithmetic; basic algebra; applications, based on geometry; right triangle trigonometry, oblique angle trigonometry and compound angles. This course was formerly module 1 in related instruction.

Total Credits 1.00

Course Competencies

- 1 Perform arithmetic operations on whole numbers and fractions.
- 2 Determine powers and roots.
- 3 Solve percentage, ratio and proportion problems.
- 4 Perform arithmetic operations on signed numbers.
- 5 Evaluate expressions involving order of operations.
- 6 Solve equations.
- 7 Perform basic geometric operations
- 8 Apply the Pythagorean Theorem to right triangles.
- 9 Solve right triangles
- 10 Apply laws of sines and cosines
- 11 Analyze shop applications by constructing triangles .
- 12 Apply geometric formulas to right and oblique triangles.
- 13 Solve compound angle applications.

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50-420-712 Communications for Apprentices

Course Outcome Summary

Course Information

Description Introduces the apprentice to basic communication concepts relating to the workplace. It is designed specifically for the apprentice to acquire the necessary skills of giving instructions, writing a technical memo, and explaining a technical process. Throughout the course the apprentice will brainstorm, write, edit, revise, and use one-on-one communication delivery in a small group. The course combines lecture and hands-on activities utilizing information which the apprentice brings from the workplace.

Total Credits 1.00

Course Competencies

- 1 Deliver orally a set of instructions to another individual
- 2 Write a technical memo
- 3 Explain a technical process to a small group.

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50-420-510 Industrial Manufacturing Technician Apprenticeship 1

Course Outcome Summary

Course Information

Description The first semester of related instruction includes an orientation to the trade and manufacturing, then followed by the MSSC safety module, MSSC quality module, OSHA 10 certification, blueprint reading, visual inspection, measurement and first aid & CPR training. Manufacturing concepts will be introduced and applied in a variety of manufacturing settings. MSSC modules 1 and 2 are aligned with the learning plans for this course along with the MATC course Machine Trades Math.

Total Credits 3.00

Course Competencies

- 1 Compare various roles for manufacturing and become oriented to the trade of industrial manufacturing technicians (MSSC module 1, units 1-8) at 8 hours
- 2 Apply safety requirements to manufacturing and production (MSSC Safety module 1, units 9-18) -16 hours
- 3 Apply quality and continuous improvement practices to manufacturing and production (MSSC Quality module 2, units 19-34) -16 hours
- 4 Apply math skills to manufacturing processes and problems (32 hours)
- 5 Interpret technical and manufacturing documents (24 hours)
- 6 Measure parts, products and finished goods accurately (8 hours)
- 7 Demonstrate effective visual inspection techniques for machines, equipment, tools, parts, and products (8 hours)
- 8 Complete the requirements for OSHA 10 safety certification (10 hours)
- 9 Complete the requirements and obtain First Aid and CPR certifications (8 hours)

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50-420-512 Industrial Manufacturing Technician Apprentice 2

Course Outcome Summary

Course Information

Description The second semester of related instruction includes the MSSC manufacturing processes and production and maintenance awareness modules, along with communication, lean manufacturing, problem solving, and frontline leadership. Manufacturing related concepts will be applied to a variety of industrial setting. The course wraps-up with an examination of emerging trends and technologies, and future directions for manufacturing. MSSC learning objectives in modules 3 and 4 are aligned with the learning plans for this course. In addition, the MATC Communication for Apprentices course is included in the learning plans but will stand alone for registration and transcript purposes.

Total Credits 3.00

Pre-requisite: Related Instruction Term 1 is recommended

Course Competencies

- 1 Identify customer needs and required resources for production processes (MSSC module 3, units 35-37) - 8 hours
- 2 Apply mechanical principles to equipment and production processes (MSSC module 3, units 38- 43) - 8 hours
- 3 Set-up and operate machining processes, tooling and equipment (MSSC module 3, units 44-48) - 8 hours
- 4 Monitor production and compliance with specifications, and be aware of preparing products for shipping (MSSC module 3, units 49-54) - 8 hours
- 5 Review MSSC CPT assessment and certification requirements for manufacturing processes and production (MSSC module 3, ALL UNITS) - Final 8 hours of 40
- 6 Apply principles of welding, basic electricity, and fluid power systems to manufacturing equipment maintenance awareness (MSSC module 4, units 55-61) = 8 hours
- 7 Examine common applications for lubricants, coolants, bearings, couplings, belt drives and chain drives in manufacturing equipment maintenance (MSSC module 4, units 62-65) = 8 hours
- 8 Apply machine control and automation concepts to awareness of machine maintenance (MSSC module 4, units 66-67) = 8 hours
- 9 Relate modes of machine operations to awareness of manufacturing equipment maintenance (MSSC module 4, units 68-69) = 8 hours
- 10 Review MSSC CPT assessment and certification requirements for maintenance awareness (MSSC module 4, ALL UNITS) - Final 8 hours of 40
- 11 Communicate industrial and manufacturing information effectively (32 hours)
- 12 Apply lean manufacturing principles to work processes performed by the trade (4 hours)
- 13 Apply problem solving to high performance manufacturing (4 hours)
- 14 Apply leadership skills to high performance manufacturing (4 hours)
- 15 Examine emerging industrial technologies and trends in green manufacturing (4 hours)

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47-455-455 Transition to Trainer: Your Role as a Journey Worker

Course Outcome Summary

Course Information

Description Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade.

You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job.

Course Competencies

- 1 Value your role as a journey worker trainer
- 2 Serve as a mentor and job coach
- 3 Foster a positive work environment by acting as an ally/advocate
- 4 Provide hands-on skills training
- 5 Provide feedback on apprentice performance