Automated Manufacturing Evaluation Tool

2020 Curricular Materials Review

Idaho CTE Trades and Industry (T&I) Automated Manufacturing Program Standards [[1]](#footnote-1)

**Publisher information**

* Publisher Name:
* Title:
* Grade Level:
* ISBN #:
* Author:
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# Instructions:

Complete the Publisher Standards Alignment Report below. Please provide written justification as to how the material meets the standard along with location references. If a justification requires additional space, please submit response on an additional document.

# Publisher STANDARDS ALIGNMENT Report:

## Standard AMNF.1.0: lab organization and safety procedures

### Performance Standard AMNF.1.1 General Lab Safety Rules and Procedures

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.1.1.1 Describe general shop safety rules and procedures. |  |
| CTE AMNF.1.1.2 Demonstrate knowledge of OSHA and its role in workplace safety. |  |
| CTE AMNF.1.1.3 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities (i.e., personal protection equipment – PPE). |  |
| CTE AMNF.1.1.4 Operate lab equipment according to safety guidelines. |  |
| CTE AMNF.1.1.5 Identify and use proper lifting procedures and proper use of support equipment. |  |
| CTE AMNF.1.1.6 Utilize proper ventilation procedures for working within the lab/shop area. |  |
| CTE AMNF.1.1.7 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. |  |
| CTE AMNF.1.1.8 Identify the location and use of eye wash stations. |  |
| CTE AMNF.1.1.9 Identify the location of the posted evacuation routes. |  |
| CTE AMNF.1.1.10 Identify and wear appropriate clothing for lab/shop activities. |  |
| CTE AMNF.1.1.11 Secure hair and jewelry for lab/shop activities. |  |
| CTE AMNF.1.1.12 Understand knowledge of the safety aspects of low and high voltage circuits. |  |
| CTE AMNF.1.1.13 Locate and interpret safety data sheets (SDS). |  |
| CTE AMNF.1.1.14 Perform housekeeping duties. |  |
| CTE AMNF.1.1.15 Follow verbal instructions to complete work assignments. |  |
| CTE AMNF.1.1.16 Follow written instructions to complete work assignments. |  |

### Performance Standard AMNF.1.2 Hand Tools

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.1.2.1 Identify hand tools and their appropriate usage. |  |
| CTE AMNF.1.2.2 Identify standards and metric designation. |  |
| CTE AMNF.1.2.3 Demonstrate the proper techniques when using hand tools. |  |
| CTE AMNF.1.2.4 Demonstrate safe handling and use of appropriate tools. |  |
| CTE AMNF.1.2.5 Identify proper cleaning, storage, and maintenance of tools. |  |

### Performance Standard AMNF.1.3 Power Tools and Equipment

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.1.3.1 Identify power tools and their appropriate usage. |  |
| CTE AMNF.1.3.2 Identify equipment and their appropriate usage. |  |
| CTE AMNF.1.3.3 Demonstrate the proper techniques when using power tools and equipment. |  |
| CTE AMNF.1.3.4 Demonstrate safe handling and use of appropriate power tools and equipment. |  |
| CTE AMNF.1.3.5 Identify proper cleaning, storage, and maintenance of power tools and equipment |  |

## Standard AMNF.2.0: apply fundamental print reading, measuring, and cadd

### Performance Standard AMNF.2.1 Demonstrate Print Reading Practices

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.2.1.1 Interpret basic elements of a technical drawing (i.e., title block information, dimensions). |  |
| CTE AMNF.2.1.2 Identify industry standard symbols (i.e., hydraulic, pneumatic, electrical, welding, mechanical). |  |
| CTE AMNF.2.1.3 Prepare a materials list from a technical drawing. |  |
| CTE AMNF.2.1.4 Describe various types of drawings (i.e., part, assembly, pictorial, orthographic, isometric, and schematic). |  |
| CTE AMNF.2.1.5 Understand dimensioning and tolerance, sectional drawings, fasteners, tables, charts, and assembly drawings. |  |

### Performance Standard AMNF.2.2 Demonstrate Measuring and Scaling Techniques

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.2.2.1 Identify industry standard units of measure. |  |
| CTE AMNF.2.2.2 Convert between customary (i.e., SAE, Imperial) and metric systems. |  |
| CTE AMNF.2.2.3 Determine appropriate engineering and metric scales. |  |
| CTE AMNF.2.2.4 Measure and calculate speed, distance, object size, area, and volume. |  |
| CTE AMNF.2.2.5 Determine and apply the equivalence between fractions and decimals. |  |
| CTE AMNF.2.2.6 Demonstrate proper use of precision measuring tools (i.e., micrometer, dial-indicator, and dial-caliper) and inspecting parts to print. |  |

### Performance Standard AMNF.2.3 CADD, CAM

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.2.3.1 Develop three‐dimensional models (i.e., wireframe, surface, solid, or parametric). |  |
| CTE AMNF.2.3.2 Interpret and create design and working drawings. |  |
| CTE AMNF.2.3.3 Properly post-process data to create G-code program. |  |

### Performance Standard AMNF.2.4 Simulation

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.2.4.1 Demonstrate an understanding of simulation software. |  |

## Standard AMNF.3.0: apply fundamental power system principles

### Performance Standard AMNF.3.1 Identify and Utilize Basic Mechanical Systems

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.3.1.1 Understand examples of the six simple machines, their attributes and components. |  |
| CTE AMNF.3.1.2 Identify the power source of various systems machinery and tools. |  |
| CTE AMNF.3.1.3 Explain concepts of mechanical advantage. |  |
| CTE AMNF.3.1.4 Understand basic machine maintenance. |  |

### Performance Standard AMNF.3.2 Identify and Utilize Basic Fluid Systems

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.3.2.1 Define fluid systems (e.g., hydraulic, pneumatic, vacuum). |  |
| CTE AMNF.3.2.2 Identify and define the components of fluid systems. |  |
| CTE AMNF.3.2.3 Compare and contrast hydraulic and pneumatic systems. |  |
| CTE AMNF.3.2.4 Identify the advantages and disadvantages of using fluid power systems. |  |
| CTE AMNF.3.2.5 Explain the difference between gauge pressure and absolute pressure. |  |
| CTE AMNF.3.2.6 Discuss the safety concerns of working with liquids and gases under pressure. |  |
| CTE AMNF.3.2.7 Discuss mechanical advantage using Pascal’s law. |  |
| CTE AMNF.3.2.8 Discuss values in a pneumatic system, using the ideal gas laws. |  |
| CTE AMNF.3.2.9 Design, construct, and test various fluid systems. |  |

### Performance Standard AMNF.3.3 Identify and Utilize Basic Electrical Systems

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.3.3.1 Define AC and DC electrical systems and terminology. |  |
| CTE AMNF.3.3.2 Discuss the safety concerns of working with electricity. |  |
| CTE AMNF.3.3.3 Describe the principles of generation, transmission, distribution, and storage of electricity. |  |
| CTE AMNF.3.3.4 Identify the advantages and disadvantages of using electrical systems. |  |
| CTE AMNF.3.3.5 Compute values of current, resistance, and voltage using Ohm’s Law. |  |
| CTE AMNF.3.3.6 Identify series, parallel, and series-parallel (combination) circuits. |  |
| CTE AMNF.3.3.7 Introduce single-phase and three-phase AC power. |  |
| CTE AMNF.3.3.8 Describe the laws, principles, and types of electricity to utilize equipment used in an industrial environment. |  |
| CTE AMNF.3.3.9 Construct and test simple electrical circuits from a schematic. |  |
| CTE AMNF.3.3.10 Explain electrical motor systems and motor controls by application. |  |

## Standard AMNF.4.0: Identify and apply manufacturing processes

### Performance Standard AMNF.4.1 Identify Material Properties and Science

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.4.1.1 Identify the major material families used in manufacturing. |  |
| CTE AMNF.4.1.2 Differentiate between the various types of material properties and their application. |  |
| CTE AMNF.4.1.3 Discuss the impact of material usage on the environment. |  |
| CTE AMNF.4.1.4 Explain how production is affected by the availability, quality, and quantity of resources. |  |
| CTE AMNF.4.1.5 Differentiate among raw material standard stock and finished products. |  |

### Performance Standard AMNF.4.2 Identify Manufacturing Processes

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.4.2.1 Identify and describe the five major manufacturing processes (i.e., forming, separating, joining, conditioning, and finishing). |  |
| CTE AMNF.4.2.2 Discuss the impact of manufacturing processes on the environment. |  |
| CTE AMNF.4.2.3 Describe LEAN manufacturing and explain its importance. |  |

### Performance Standard AMNF.4.3 Apply Manufacturing Processes

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.4.3.1 Demonstrate cutting methods of metals and plastics. |  |
| CTE AMNF.4.3.2 Demonstrate drilling methods of metals and plastics. |  |
| CTE AMNF.4.3.3 Demonstrate grinding methods of metals. |  |
| CTE AMNF.4.3.4 Demonstrate finishing methods of metals and plastics. |  |

### Performance Standard AMNF.4.4 Identify Fasteners

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.4.4.1 Identify various fastening methods (e.g., rivets, welds, adhesive, screws, seams). |  |
| CTE AMNF.4.4.2 Categorize fastening methods by appropriate applications. |  |
| CTE AMNF.4.4.3 Demonstrate fastening methods on various materials. |  |

## Standard AMNF.5.0: Apply fundamental electronic and instrumentation principles

### Performance Standard AMNF.5.1 Demonstrate Control Technology and Automation Principles

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.5.1.1 Research the history and fundamentals of automation and control systems. |  |
| CTE AMNF.5.1.2 Identify applications of control logic. |  |
| CTE AMNF.5.1.3 Distinguish programmable controllers and PLC components and their functions. |  |
| CTE AMNF.5.1.4 Interpret programming diagrams. |  |
| CTE AMNF.5.1.5 Program ladder logic statements to perform a specific task. |  |

## Standard AMNF.6.0: Machining

### Performance Standard AMNF.6.1 Manual Machining

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.6.1.1 Hand sharpen cutting tools. |  |
| CTE AMNF.6.1.2 Perform maintenance on machines and tools. |  |
| CTE AMNF.6.1.3 Deburr work pieces. |  |
| CTE AMNF.6.1.4 Set up and operate power saws. |  |
| CTE AMNF.6.1.5 Set up and operate grinders. |  |
| CTE AMNF.6.1.6 Set up and operate lathes including tool and parts setups. |  |
| CTE AMNF.6.1.7 Set up and operate milling machines including tool and parts setups. |  |
| CTE AMNF.6.1.8 Use appropriate inspection gages. |  |

### Performance Standard AMNF.6.2 CNC Machining

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.6.2.1 Demonstrate an understanding of the control interface. |  |
| CTE AMNF.6.2.2 Demonstrate knowledge and the ability to properly mount stock. |  |
| CTE AMNF.6.2.3 Demonstrate a thorough understanding of tooling. |  |
| CTE AMNF.6.2.4 Demonstrate the ability to properly select an NC (numeric code) program. |  |
| CTE AMNF.6.2.5 Demonstrate the ability to verify and dry run the program. |  |
| CTE AMNF.6.2.6 Demonstrate the ability run the NC program. |  |
| CTE AMNF.6.2.7 Demonstrate an understanding of NC programming. |  |
| CTE AMNF.6.2.8 Demonstrate an understanding of coordinate systems. |  |
| CTE AMNF.6.2.9 Demonstrate the ability to develop an NC program. |  |
| CTE AMNF.6.2.10 Demonstrate the ability to edit an NC program. |  |

## Standard AMNF.7.0: Additive (3d) printing

### Performance Standard AMNF.7.1 Operation

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.7.1.1 Set up and operate a 3D printer. |  |
| CTE AMNF.7.1.2 Recognize design considerations. |  |

## Standard AMNF.8.0: Robotics and materials handling systems

### Performance Standard AMNF.8.1 Process Automation

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| Student Competencies by Performance Standard | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| CTE AMNF.8.1.1 Demonstrate the knowledge of robotics and material handling equipment. |  |
| CTE AMNF.8.1.2 Discuss conveyors, robotic arms, material handlers, pick-and-place technology. |  |

# Indicators of quality Rubric:

Standards aligned and Integrated Curriculum:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. The curriculum is based on industry-validated technical standards and competencies. |  |
| 1. The curriculum is aligned with relevant content and standards for core subjects, such as reading, math and science, including federal, state and/or local standards, as appropriate. |  |
| 1. The curriculum incorporates employability skill standards that help students succeed in the workplace, such as problem solving, critical thinking, teamwork, communications and workplace etiquette. |  |
| 1. The curriculum allows for student application of integrated knowledge and skills in authentic scenarios. |  |
| 1. Materials used reflect current workplace, industry and/or occupational practices and requirements. |  |

Access and Equity:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. Materials are provided in a way that ensures all students have the opportunity to achieve success in the program of study, including by meeting Title IX, Americans with Disabilities Act and other accessibility requirements. |  |
| 1. Materials and assessments are free from bias, inclusive and non-discriminatory, and offered in a way that ensures all students have the opportunity to achieve success in the program of study. |  |
| 1. Contains guidance to support differentiated and culturally responsive (i.e., purposefully represents diverse cultures, linguistic backgrounds, learning styles and interests) instruction in the classroom so that every student’s need are addressed by including:    1. Suggestions for how to promote equitable instruction by making connections to culture, home, neighborhood, and community as appropriate.    2. Appropriate scaffolding, interventions, and supports, including integrated and appropriate reading, writing, listening, and speaking alternatives (e.g., translations, picture support, graphic organizers) that neither sacrifice content nor avoid language development for English language learners, special needs, or below grade level readers.    3. Digital and print resources that provide various levels of readability.    4. Modifications and extensions for all students, including those performing above their grade level, to deepen understanding of the content.    5. Materials in multiple language formats. |  |

Student Focus:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. The material supports the sequential and cumulative development of foundational skills and progresses in specificity to build students’ depth of knowledge and skills. Those skills are necessary for a student’s independent comprehension of grade-level complex texts and mastery of tasks called for by the standards. |  |
| 1. Content and standards within the program of study are non-duplicative and vertically aligned to prepare students to transition seamlessly to the next level of education. |  |
| 1. The material provides many and varied opportunities for students to work with each standard within the grade level. |  |
| 1. The material cross-refers and integrates other content areas. |  |
| 1. The material has a balance of text types and lengths that encourage close, in-depth reading and rereading, analysis, comparison, and synthesis of texts. |  |
| 1. The material includes sufficient supplementary activities or assignments that are appropriately integrated into the text. |  |
| 1. The material has activities and assignments that develop problem-solving skills and foster synthesis and inquiry at both an individual and group level. |  |
| 1. The material has activities and assignments that reflect varied learning styles of students. |  |
| 1. The material includes appropriate instructional strategies. |  |
| 1. Project-based learning and related instructional approaches, such as problem-based, inquiry-based and challenge-based learning, are fully integrated into the material. |  |

Pedagogical Approach:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. Provides guidance for teachers throughout for how learning experiences build on each other to support students in developing a deep understanding of the content. |  |
| 1. Provides scaffolded supports for teachers to facilitate learning of the content so that students are increasingly responsible for making sense of the content. |  |
| 1. The material provides opportunities for supporting English language learners to regularly and actively participate with grade-level text. |  |
| 1. The material gives clear and concise instruction to teachers and students. It is easy to navigate and understand. |  |
| 1. Includes appropriate academic and content-specific vocabulary in the context of the learning experience that is accessible, introduced, reinforced, reviewed, and augmented with visual representations when appropriate. |  |
| 1. Allows teachers to access, revise, and print form digital resources (e.g., readings, labs, assessments, rubrics). |  |
| 1. Uses varied modes (selected, constructed, project-based, extended response, and performance tasks) of instruction-embedded pre-, formative, summative, peer, and, self-assessment measures of learning. |  |
| 1. Includes editable and aligned rubrics, scoring guidelines, and exemplars that provide guidance for assessing student performance and to support teachers in planning instruction and providing ongoing feedback to students. |  |
| 1. Provides multiple opportunities for students to demonstrate and receive feedback on performance of practices connected with their understanding of concepts. |  |

Presentation and Design:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. The material has an aesthetically appealing appearance. |  |
| 1. Digital and print materials are consistently formatted, visually focused, and uncluttered for efficient use. |  |
| 1. The material has a reasonable and appropriate balance between text and illustration. The material has grade-appropriate font size. |  |
| 1. The illustrations clearly cross-reference the text, are directly relevant to the content (not simply decorative), and promote thinking, discussion, and problem solving. |  |
| 1. Non-text content (performance clips, images, maps, globes, graphs, pictures, charts, databases, and models) are accurate and well integrated into the text. |  |

Technology:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. |
| --- | --- |
| 1. Technology and digital media support, extend, and enhance learning experiences. |  |
| 1. The material has “platform neutral” technology (i.e., cloud based) and availability for networking. |  |
| 1. The material has a user-friendly and interactive interface allowing the user to control (shift among activities). |  |

For Questions Contact

Content & Curriculum

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1. [Idaho AFNR Agribusiness Program Standards](https://cte.idaho.gov/wp-content/uploads/2016/01/Agribusiness_Program_Standards-1.pdf) [↑](#footnote-ref-1)