



Computer Integrated Manufacturing Unit 4: Process Flow Chart

Unit Focus

Computer-integrated manufacturing (CIM) is an introduction to the use of computer techniques to integrate manufacturing activities. These activities encompass all functions necessary to translate customer needs into a final product. CIM usually starts with the development of a product concept then product design and specification with the final step revolving around automating the manufacturing process.

This culminating unit will serve as the final exam. It will require students to apply what they learned in each of the three modules (rapid prototyping, CNC Mill manufacturing and automation) in creating solution to a manufacturing problem.

The PBA will have students conceptualize and collectively design an automation process of cleaning a cell phone.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Connecticut Goals and Standards <i>Manufacturing: 12</i> <ul style="list-style-type: none">Apply a variety of manufacturing techniques and processes to create a usable product <i>MAN.03.03</i> <i>Pre-Engineering Technology: 12</i> <ul style="list-style-type: none">Describe and utilize the steps in the design process. <i>ENG.02.01</i>Test a prototype. <i>ENG.02.09</i>Use all tools and equipment safely <i>ENG.06.03</i>Describe and demonstrate the process for using CAD in a design solution. <i>ENG.07.04</i> CSTA: Computer Science Standards (2017-) <i>CSTA: 9-10</i> <ul style="list-style-type: none">Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. <i>3A-AP-13</i>Systematically design and develop programs for broad audiences by incorporating feedback from users. <i>3A-AP-19</i> ITEEA - Standards for Technological Literacy <i>Technological Literacy: K-12</i>	<i>Students will be able to independently use their learning to...</i> T1 Demonstrate professionalism through exhibiting attentiveness, growing from feedback, and adhering to industry standards (safety). T2 Develop a product/solution that adheres to key parameters (e.g., cost, timeline, restrictions, available resources and audience). T3 Communicate effectively based on purpose, task, and audience using appropriate vocabulary.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 The less time a part takes to make, the more potential profit is available. U2 Jigs and fixtures are essential in maintaining consistency and quality control. U3 During the design and development process, a flowchart or pseudocode are used to plan and depict the process flow for an entire system and all of its subsystems.	<i>Students will keep considering...</i> Q1 How do I plan and organize a manufacturing process?

Stage 1: Desired Results - Key Understandings

<ul style="list-style-type: none"> Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving. <i>10</i> Students will develop the abilities to use and maintain technological products and systems. <i>12</i> Students will develop an understanding of and be able to select and use manufacturing technologies. <i>19</i> <p>Madison Public Schools Profile of a Graduate</p> <ul style="list-style-type: none"> Idea Generation: Studying a problem, need or model (mentor text, political piece, documents, art work, etc.) to consider limitations and imagine new solutions/transformations. (POG.2.1) Collective Intelligence: Working respectfully and responsibly with others, exchanging and evaluating ideas to achieve a common objective. (POG.3.1) 	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<p><i>Students will know...</i></p> <p>K1 The differences between jigs and fixtures.</p> <p>K2 Flow Process Chart</p>	<p><i>Students will be skilled at...</i></p> <p>S1 Create a flowchart or pseudocode to perform a task.</p> <p>S2 Design a manufacturing system with consideration to time and cost to produce a product.</p> <p>S3 Design and create a jig and/or fixture to help increase the efficiency of a process.</p>