

Curriculum Framework – Computer Integrated Manufacturing

Unit 4 Integration of Manufacturing – Lesson 4.1 CIM Systems

Desired Results *(stage 1)*

ESTABLISHED GOALS

It is expected that students will...

- G1 – Demonstrate an ability to identify, formulate, and solve engineering problems.
- G2 – Demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- G3 – Demonstrate an ability to design and conduct experiments, as well as to analyze and interpret data.
- G4 – Demonstrate an ability to apply knowledge of mathematics, science, and engineering.

Transfer

TRANSFER: *Students will be able to independently use their learning to ...*

- T1 – Construct an explanation of an observed manufacturing system. (NGSS Engineering Practice 6)
- T2 – Develop a career plan. (ABET 2014-2015, criterion 3f and i)

Meaning

UNDERSTANDINGS: *Students will understand that ...*

- U1 – The process of mass production is used when the same product is created repeatedly.
- U2 – A workcell is a group of machines in which each individual machine has its own specialty.
- U3 – A flexible manufacturing system is one that can adapt to a wide variety of products.
- U4 – Manufacturing and automation careers are varied in scope and location.
- U5 – Tradeoffs are made when one system is utilized over another.
- U6 – Process flow design has a major impact on overall production time and product profit.
- U7 – During the design and development process, flowcharting is used to plan and depict the detailed process flow for an entire system and all of its subsystems.
- U8 – Flowcharting can be used to illustrate the phases of the product development process.

ESSENTIAL QUESTIONS: *Students will keep considering ...*

- Q1 – What should be considered when designing a manufacturing system?
- Q2 – Who are reliable sources for career advice?
- Q3 – What resources are available to develop a career plan?
- Q4 – When should a career plan be started?
- Q5 – How often should a career plan be updated?

<ul style="list-style-type: none"> • G5 – Demonstrate an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. • G6 – Pursue the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. • G7 – Demonstrate an understanding of professional and ethical responsibility. • G8 – Demonstrate an ability to function on multidisciplinary teams. • G9 – Demonstrate an ability to communicate effectively. • G10 – Gain knowledge of contemporary issues. • G11 – Recognize the need for, and develop an ability to engage in life-long learning. 	Acquisition	
<p>KNOWLEDGE: <i>Students will...</i></p> <ul style="list-style-type: none"> • K1 – Describe common CIM systems. U1, U2, U3, U4, U5 • K2 – Recognize machines and processes in a manufacturing setting. U1, U4, U5 	<p>SKILLS: <i>Students will...</i></p> <ul style="list-style-type: none"> • S1 – Compare and contrast common CIM systems. U1, U2, U3, U4, U5 • S2 – Breakdown a manufacturing system into machines and processes. U1, U4, U5 • S3 – Organize and express thoughts and information in a clear and concise manner. U4 • S4 – Explain factors that effect a manufacturing career. U4 	

Evidence (stage 2)		
Activities (A) Projects (P) Problems(B)	Assessment FOR Learning	Assessment OF Learning
4.1.1.A Manufacturing Field Trip	<ul style="list-style-type: none"> • Essential questions • Notes made during the field trip • Questions posed by student during the field trip • Answers to questions posed during the field trip 	<ul style="list-style-type: none"> • Responses to the procedure prompts • Conclusion questions
4.1.2.P Manufacturing and Automation Careers	<ul style="list-style-type: none"> • Essential questions • Research notes • Reflection responses 	<ul style="list-style-type: none"> • Responses to the scenario questions • Report of research • Presentation of research • Reflection responses • Conclusion questions

Learning Plan (stage 3)	
Activities (A) Projects (P) Problems(B)	Knowledge and Skills
4.1.1.A Manufacturing Field Trip	K1, K2, S1, S2
4.1.2.P Manufacturing and Automation Careers	K1, K2, S1, S2, S3, S4