

Introduction to Manufacturing: Product Design & Innovation

COURSE DESCRIPTION

Introduction to Manufacturing: Product Design & Innovation

Think about the last time you visited your favorite store. Have you ever wondered how the products you buy make it to the store shelves? Whether it is video games, clothing, or sports equipment, the goods we purchase must go through a manufacturing process before they can be marketed and sold. In this course, you'll learn about the types of manufacturing systems and processes used to create the products we buy every day. You'll also be introduced to the various career opportunities in the manufacturing industry including those for engineers, technicians, and supervisors. As a culminating project, you'll plan your own manufacturing process for a new product or invention! If you thought manufacturing was little more than mundane assembly lines, this course will show you just how exciting and fruitful the industry can be.

COURSE METHODOLOGY

- This is an inquiry-based course. Students will generate knowledge through online readings, asynchronous discussions with students and their instructor, interactions with online tutorials, and online and hands-on simulations.
- The instructor will act as a guide, a facilitator, an events planner, and a resource advisor. He/she will always be available through course message.
- The student must actively construct and acquire knowledge by being intrinsically motivated to succeed. To succeed, students must participate and complete all readings and activities. This course requires the student's active participation.
- Both formal and informal assessment methods will be used in the course. Informal assessment will include an evaluation of the quality and timeliness of participation in class activities. Formal assessment may include multiple-choice quizzes, tests, discussion board participation, and written assignments. A final exam will be given at the end of the course.

COURSE PARTICIPATION OBJECTIVES

This course for which you are registered is a college preparatory, academically rigorous course that covers an entire semester's worth of material. As such, it is important that you adhere to the following guidelines as you manage your time and commit to successfully completing all required coursework:

1. The requirements for this course are equivalent to completion of minimum of 90+ hours of class instruction at a traditional on-site high school
2. Assignments must be submitted for each unit as they are completed so that the teacher may review and assess your performance. Do not hold your work, you must submit each unit's homework as it is completed, demonstrating weekly assignment completions
3. You must log in regularly to your course to demonstrate continued participation, and completion of all course requirements, including assignments, assessments and discussion forums
4. You must complete your individual work and any incident of suspected cheating, plagiarism or collaboration on assignments violates the academic integrity expectations outlined at the time of your enrollment and can result in failure of the course or further action as deemed appropriate

Citizenship

Students are expected to conduct themselves in a responsible manner that reflects sound ethics, honor, and good citizenship. It is the student's responsibility to maintain academic honesty and integrity and to manifest their commitment to the goals of NUVHS through their conduct and behavior. Students are expected to abide by all NUVHS policies and regulations. Any form of academic dishonesty, or inappropriate conduct by students or applicants may result in penalties ranging from warning to dismissal, as deemed appropriate by NUVHS.

Communication

Throughout this course students will need to be in close contact with their instructor and fellow students. Students are expected to communicate via course message and electronic discussion boards. Therefore, students should plan on checking their course messages at least three times a week and participate in the discussion boards during the weeks they are live.

Instructors strongly encourage and welcome open communication. Clear, consistent, and proactive communication will ensure a successful experience in this course. It is the student's responsibility to notify the instructor immediately if and when a personal situation occurs that affects his/her performance in this class. Being proactive with communication will result in a quick solution to any problems that may occur.

COURSE OUTLINE

Unit 1 – Introduction to Manufacturing

America has been called a land of consumers. Our society has become accustomed to the luxury of purchasing commodities from retail stores in a way that is convenient and affordable. Most of us don't take the time to think much past the checkout line, however. Where do these products come from exactly? Were they made in our country or shipped in from somewhere else entirely? What machines and equipment were used to make the items we purchase? Who are the people involved in manufacturing and assembling the finished goods that line the shelves of our favorite stores? This course will give you a behind-the-scenes look at the vast industry called manufacturing. In this unit, you'll examine the basics of manufacturing, including a brief history and some of the basic processes and principles that work together to transform raw materials into useful and valuable commodities.

Learning Objectives

- Discuss the field of manufacturing, including disciplines within manufacturing—such as engineering, science, and technology—and how they work together toward an end.
- Describe manufacturing processes such as input, output, and feedback.
- Distinguish between different types of manufacturing methods and processes.
- List the steps in the risk-management process.

Activities

Unit 1 Text Questions	Homework	10 points
Unit 1 Online Lab Questions	Homework	10 points
Unit 1 Activity	Homework	15 points
Unit 1 Discussion 1	Discussion	5 points
Unit 1 Discussion 2	Discussion	5 points
Unit 1 Quiz	Quiz	15 points

Unit 2: Success in Manufacturing – Part 1: Soft Skills

After learning about the various processes involved in manufacturing, you may think that strength or attention to detail is the key to being a successful employee in the manufacturing industry. Many people are surprised to learn that some of the most important skills required in this field aren't at all physical in nature. In this unit, you'll explore some of the "soft" skills that, when properly developed, can jump-start a career in manufacturing.

Learning Objectives

- Discuss regulations and expectations in the workplace.
- Demonstrate communication techniques necessary to succeed in manufacturing.
- Define work ethic.
- Use time-management techniques.
- Explain how negotiation affects conflict resolution.

Activities

Unit 2 Text Questions	Homework	10 points
Unit 2 Online Lab Questions	Homework	10 points
Unit 2 Activity	Homework	15 points
Unit 2 Discussion 1	Discussion	5 points
Unit 2 Discussion 2	Discussion	5 points
Unit 2 Quiz	Quiz	15 points

Unit 3: Success in Manufacturing – Part 2: Teamwork

Think back to a time when you were required to work alongside others to achieve a common goal. Perhaps it was a school project or an extracurricular activity, such as a sport. What challenges did you face together? Many people have experienced or witnessed conflicts with others when working in teams. These conflicts can damage relationships and keep the team from accomplishing its goals. When a team is dysfunctional at work, it can cost the company money, so good teamwork is particularly important in the workplace. In this unit, you'll learn about some of the most important teamwork skills employees need to be successful on the job, particularly in the manufacturing industry.

Learning Objectives

- Describe how teams function together, solve problems, and measure results.
- Identify team roles.
- Discuss theories of motivation.
- Classify the stages of team development.

Activities

Unit 3 Text Questions	Homework	10 points
Unit 3 Online Lab Questions	Homework	10 points
Unit 3 Activity	Homework	15 points
Unit 3 Discussion 1	Discussion	5 points
Unit 3 Discussion 2	Discussion	5 points
Unit 3 Quiz	Quiz	15 points

Unit 4: Success in Manufacturing – Part 3: Manufacturing Applications (Hard Skills)

As you learned in the previous units, “soft” skills are those skills necessary to work well with people. People skills aren’t the only things to be concerned with in the manufacturing industry, however. Many employees who work in this field must operate machinery and equipment for manufacturing and assembling products. Others must develop strategies for manufacturing goods in a way that saves the company time and money. In this unit, you’ll discover some of these “hard” skills that enable employees in the manufacturing industry to do their jobs effectively.

Learning Objectives

- Discuss roles and tasks common in the manufacturing industry.
- Describe quality and how it is measured in manufacturing.
- Explain how inventory is managed in the manufacturing industry.
- Evaluate different quality control applications in manufacturing.
- Define work systems design and human resource management.

Activities

Unit 4 Text Questions	Homework	10 points
Unit 4 Online Lab Questions	Homework	10 points
Unit 4 Activity	Homework	15 points
Unit 4 Discussion 1	Discussion	5 points
Unit 4 Discussion 2	Discussion	5 points
Unit 4 Quiz	Quiz	15 points

Unit 4: Success in Manufacturing – Part 3: Manufacturing Applications (Hard Skills) (Continued)

Midterm Exam Objectives

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from the first four units in this course (Note: You will be able to open this exam only one time.)

Midterm Exam Activities

Midterm Discussion	Discussion	5 points
Midterm Exam	Exam	50 points

Unit 5: Success in Manufacturing – Part 4: Engineering Applications (Hard Skills)

As you’ve learned, engineering and manufacturing are closely related fields. Engineers are those men and women who work behind the scenes studying the manufacturing process, choosing the best equipment and machinery for the job, and even designing new products. While some of the tasks may overlap, engineers typically need a different skill set than manufacturing employees do. In this unit, you’ll learn about some of those skills that help engineers do their jobs to the best of their abilities.

Learning Objectives

- Analyze engineering concepts.
- Describe and produce engineering drawings.
- Compare and contrast lean manufacturing and lean engineering.
- Define manufacturing engineering and systems engineering.

Activities

Unit 5 Text Questions	Homework	10 points
Unit 5 Online Lab Questions	Homework	10 points
Unit 5 Activity	Homework	15 points
Unit 5 Discussion 1	Discussion	5 points
Unit 5 Discussion 2	Discussion	5 points
Unit 5 Quiz	Quiz	15 points

Unit 6: Safety in Manufacturing

There are many advantages to working in the manufacturing industry, but one of the downfalls is the exposure to risks and hazards. Because of the heavy equipment involved, manufacturing is one of the most dangerous industries there is. Each year, many workers in this field are injured and even killed on the job. Because of these serious risks, government regulations have been put into place to keep manufacturing employees safe while at work. In this unit, you'll examine some of the most important guidelines that employers must follow to protect the men and women who work for them.

Learning Objectives

- Discuss workers' rights.
- Evaluate hazards manufacturing employees face.
- Identify government regulations that protect workers in the manufacturing industry.
- Explain how to identify and dispose of hazardous material.

Activities

Unit 6 Text Questions	Homework	10 points
Unit 6 Online Lab Questions	Homework	10 points
Unit 6 Activity	Homework	15 points
Unit 6 Discussion 1	Discussion	5 points
Unit 6 Discussion 2	Discussion	5 points
Unit 6 Quiz	Quiz	15 points

Unit 7: Careers in Manufacturing

Over the duration of this course, you’ve learned about many different areas of manufacturing, from assembly line work to human resource management. Because the industry is so vast and complex, it offers many diverse career opportunities for potential employees. In this unit, you’ll explore some of those career opportunities. You’ll also have the chance to develop some personal career goals of your own.

Learning Objectives

- Analyze the various specializations in manufacturing.
- Identify the education and training required for various careers in manufacturing.
- Report on a specific career in the manufacturing industry.
- Evaluate personal career goals.

Activities

Unit 7 Text Questions	Homework	10 points
Unit 7 Online Lab Questions	Homework	10 points
Unit 7 Activity	Homework	15 points
Unit 7 Discussion 1	Discussion	5 points
Unit 7 Discussion 2	Discussion	5 points
Unit 7 Quiz	Quiz	15 points

Unit 8: Culminating Manufacturing Project

Over the duration of this course, you’ve learned quite a bit about the manufacturing industry. In this unit, you’ll finally get to apply all that new knowledge to a project of your very own. If you’ve ever imagined inventing a new product, then you’re in luck! For this manufacturing project, you’ll be creating a new product from scratch, starting with the design and engineering process. You’ll get to choose how your product is manufactured and even develop a marketing plan for selling your finished goods.

Learning Objectives

- Discuss the stages of new product development.
- Examine how companies have new products manufactured.
- Describe effective marketing techniques.
- Participate in the operation of a manufacturing project.

Activities

Unit 8 Text Questions	Homework	10 points
Unit 8 Online Lab Questions	Homework	10 points
Unit 8 Presentation Project	Activity	15 points
Unit 8 Discussion 1	Discussion	5 points
Unit 8 Discussion 2	Discussion	5 points
Unit 8 Quiz	Quiz	15 points

Unit 8: Plant Management (Continued)

Final Exam Objectives

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from units five to eight in this course – the last four units.
(Note: You will be able to open this exam only one time.)

Final Exam Activities

Class Reflection Discussion	Discussion	10 points
Final Exam	Exam	50 points

HOW YOU WILL BE GRADED

For critical thinking questions, there are no right or wrong answers. For example, a question on your thoughts on why you think people are shy is a pretty open-ended type of question. Grades will be based on the depth of personal insight you present. **Do not simply agree or disagree** with an insight question. We are looking for critical thinking and possibly a related personal experience with the question.

It is important to provide detailed answers for insight/opinion questions.

For review questions, you should produce a more academic answer. For example, "What two categories are norms divided into?" This type of direct question requires a specific answer. Please use full sentences and proper grammar.

When submitting paragraphs, use these guidelines.

1. The first, second or last sentence contains the main idea and key words from the question or assigned topic.
2. Paragraph contains one to three explanatory sentences.
3. Paragraph contains two to four sentences about specific details related to question.
4. Details are colorful, interesting and appropriate.
5. Paragraph ends with a good closing sentence that refers to the main idea without repeating it.
6. Free of spelling and grammatical errors.

GRADE SCALE

The following grading scale will be used to determine your final letter grade.

Letter Grade	Percentage Earned
A	95%+
A-	90% - 94.9%
B+	87% - 89.9%
B	84% - 86.9%
B-	80% - 83.9%
C+	77% - 79.9%
C	74% - 76.9%
C-	70% - 73.9%
D+	67% - 69.9%
D	64% - 66.9%
D -	60% - 63.9%
F	59% and lower

SUPPORT

At NUVHS you will have access to multiple support teams. Who you contact will depend on the questions you have. Always start by contacting your teacher through the Message Center in the course. Your teacher should be able to answer your question, but if they can't, then they will direct you to another support team. If you have questions about any of the course content, your grades, or course policies, you should contact your instructor.

For questions about your enrollment, transcripts, or general school-wide policies, you can contact **NUVHS Student Services** at info@nuvhs.org or by phone at 866.366.8847. For example, if you would like to withdraw from your course, you should contact Student Services. Please note that a refund for your course can only be obtained if you drop within the first seven days of enrolling in the course.

For help with login/password issues, or other technical issues specific to the Blackboard website, you can contact the team at [National University Blackboard Learn](#). They can also be reached by phone at (888) 892-9095.

EXPECTED SCHOOL-WIDE LEARNING RESULTS (ESLRs)

Engaged Learners

- Demonstrate self-directed learning skills such as time management, and personal responsibility through the completion of course requirements
- Develop an understanding of their own preferred learning styles to enhance their overall academic potential
- Incorporate effective and relevant internet and multimedia resources in their learning process to broaden their knowledge base

Critical Thinkers

- Effectively analyze and articulate sound opinions on a variety of complex concepts
- Illustrate a variety of problem-solving strategies that strengthen college preparation and workforce readiness
- Formulate a framework for applying a variety of technology and internet-based research to enhance information literacy and collaborative thinking

Effective Communicators

- Demonstrate awareness and sensitivity to tone and voice in multiple forms of communication
- Express concepts and ideas in a variety of forms
- Enhance communication skills through the use of media rich or other technology resources

Global Citizens

- Appreciate the value of diversity
- Understand the range of local and international issues facing today's global community
- Demonstrate awareness of the importance of cultural sensitivity and social responsibility in the 21st century