



Course Outline – Manufacturing Process and Economics

Course Topic: Manufacturing Process and Economics

Recommended Contact Hours: 45 hours

Course Description:

A study of the industrial processes and the selection of ferrous and non-ferrous materials as they apply to the design of machine details and assembly tool components

Course Outcomes and Objectives

MPE-1 Identify the different classifications and properties of ferrous and non-ferrous materials

1. List two classifications of metals, with an accuracy of 100%.
2. List eleven mechanical properties of materials and correctly describe one characteristic for each.

MPE -2 Describe the production and manufacturing methods of ferrous and non-ferrous materials

1. List three products used in production of ferrous metal.
2. List five types of furnaces used in the production of ferrous metal.

MPE -3 Identify the process methods and characteristics of heat-treating

1. List five heat treatments of metal.
2. List four heat-treating techniques and correctly describe one basic process for each.
3. List two methods of testing the hardness of metal.

MPE -4 Explain the characteristics of plain carbon steel and the effects of its alloying elements.

1. List three classifications of plain carbon steels.
2. List three classifications of alloy steels.
3. Summarize the profile of 8620 steel.

MPE -5 Identify and explain the methods used in production inspection and quality control.

1. Name three common measuring tools used in industry and correctly define the accuracy of each.
2. List nine non-precision measuring instruments and correctly describe one basic application of each.
3. List nine precision measuring instruments and correctly describe the basic application of each.





Course Outline – Manufacturing Process and Economics

4. Name five high production inspection gauges and correctly describe one basic application of each.
5. Name and define two types of quality control.
6. List ten methods of production inspection.

MPE -6 Explain different foundry methods and examine their characteristics.

1. Name five common casting methods used in industry.
2. Name three types of pattern materials.
3. Describe the purpose of a chill.

MPE -7 Discuss the processing methods and characteristics of hot and cold worked materials.

1. Summarize the characteristics of hot worked metal.
2. List four hot worked metal processes.
3. Summarize the basic characteristics of cold worked metal.
4. List eight cold worked metal processes.

MPE -8 Identify different press operation techniques.

1. Name two die operation categories.
2. List eight cutting die operations.
3. Name two forming die operations.
4. Upon completion of this course, students will be able to explain traditional and not-traditional material processes.
5. List six applications of milling.
6. Name three metal removal processes using electricity and correctly describe the basic operation of each.
7. Correctly describe the basic operation of broaching.
8. Correctly describe the basic operation of turning machines.
9. Correctly describe the basic operation of drilling/boring/threading.
10. List the three steps of powder metallurgy.

MPE -9 Identify gas and electric welding processes

1. List four electric welding processes, and correctly describe the operation of each.
2. Name three gas welding processes.

MPE-10 Describe surface feature identification techniques

1. Name two types of tolerancing.
2. Correctly describe the basic method of geometric dimensioning and tolerance (g, d, & t).
3. Identify the surface features in a surface texture symbol, with 100% accuracy.





Course Outline – Manufacturing Process and Economics

MPE-11 Explain automation process applications

1. Correctly define the basic process of numerical control.
2. Correctly describe the position of the x, y, z planes in both horizontal and vertical milling machines.

MPE-12 Describe industrial plastics applications

1. Name two categories plastics, and describe the basic characteristics of each.
2. List five plastics processes.

MPE-13 Explain the design, manufacturing, implementation, and follow-up study of a manufactured component. Art to part

1. Identify the implications of manufacturing and industrial processes technology on the environment and do a class oral presentation regarding these implications, with visual aids and appropriate dress
2. Describe the process flow of a component and/or assembly from concept, design, engineering, manufacturing, delivery, and discard, i.e., “art to part”, and present their finding to the class in an oral presentation, using visual aids and appropriate dress

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