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|  | **Course:** | **MTE 130** |
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|  | **Title:** | **Metrology** |
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|  | **Long Title:** |  |
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|  | **Course Description:** | **Exposes the student to the principles of dimensional metrology. Students will learn how to use common measuring instruments relating to state-of-the-art manufacturing environments. Students will also learn the importance of Quality Control, TQM, and SPC processes as they relate to manufacturing environments. Use of a coordinate measuring machine will be delivered.** |
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|  | **Min Credit:** | **3** |
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 STANDARD COMPETENCIES:

1. Demonstrate hands on use of geometric dimensioning & tolerancing metrology methods.
2. Use common measuring tools found in manufacturing.
3. Operate a coordinate-measuring machine.
4. Perform calibration activities on various measuring instruments.
5. Collect and record data for SPC documentation.
6. Verify accuracy of machined parts.
7. List ISO standards and requirements.
8. Interpret and report measurement data on databases.
9. Describe other quality standards required in manufacturing.

 TOPICAL OUTLINE:

1. Measurement and Metrology
   1. Explain and understand the history of measurement
   2. Identify the uses of measurement
   3. Explain the act, application, and codification of measurement
   4. Explain the true meaning of tolerance
   5. Discuss GD&T methodology
2. Statistics and Metrology
   1. Discuss and identify the relationship between measurement and statistics
   2. Discuss and identify the relationship between measurement and probability
3. Systems of Measurement
   1. Identify how big, how far, and from end to end
   2. Discuss accuracy, precision, and reliability
   3. Discuss the origin of the metric system
   4. Discuss the decimal inch system
4. Measuring Instruments
   1. Identify and demonstrate the use of a steel rule
   2. Identify and demonstrate the use of vernier instruments
   3. Identify and demonstrate the use of micrometer instruments
   4. Identify and demonstrate the use of modern gauge blocks
   5. Identify and demonstrate the use of dial indicators
5. Angle Measurements
   1. Identify and discuss basic geometry
   2. Identify and demonstrate the use of the level, protractor, sine bars, and plates
   3. Discuss and use trigonometric functions
6. Optical Metrology
   1. Explain the applications of the Optical Comparator
   2. Demonstrate use and accuracy of the Optical Comparator
7. Coordinate Measuring Machines
   1. Discuss the role of a Coordinate Measuring Machine
   2. Describe the types of Coordinate Measuring Machines
   3. Demonstrate the use of a Coordinate Measuring Machine