Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 1	**Lesson Plan for:**	Reading and Understanding Industrial Blueprints		
	Session Summary:	This session will introduce the purpose and makeup of a blueprint while highlighting the key features used to interpret a drawing.		
	Objectives:	Discuss the purpose of a blueprint Interpret a blueprint including the basic lines, symbols, views, and title block Communicate various methods of generating a print and the benefits of various views. Interpret various object dimensions including object scale and tolerance.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Blueprint Reading 130 Lessons 1-18	ToolingU
	Describe and use the three basic elements of a blueprint	Web-Enhanced Lecture	Read/Review Blueprint Reading 130 Lessons 2-3; have students review a general blueprint identifying key components. The blueprint can be found from multiple internet sources or internal documents	ToolingU
	Explain the appearance and use of different views commonly observed on blueprints.	Web-Enhanced Lecture	Read/Review Blueprint Reading 130 Lessons 4-7; Demonstrate examples of various views of prints using internet sources or internal examples	ToolingU
	Communicate the extensions, lines, and three principal dimensions of an object	Web-Enhanced Lecture	Read/Review Blueprint Reading 130 Lessons 8-18	ToolingU
	Explain the purpose and functions of a blueprint	Web-Enhanced Lecture; Hands-on	Have student write the direction of how to build a object such as a bridge from popsicle sticks. Team the students up and have another students build that object following only the directions given.	Popsicle sticks
Evaluation	Identifying the basic elements and dimensions of a blueprint.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 2	**Lesson Plan for:**	Basic Mathematical Concepts		
	Session Summary:	This session will introduce students to the proper order of operations for solving basic addition, subtraction, multiplication, and division problems.		
	Objectives:	Demonstrate the use of addition, subtraction, multiplication, and division to solve basic problems commonly found in industry. Explain the importance for solving mathematical problems in the correct order of operations Exhibit competency in accurately completing mathematical equations involving roots and powers.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Math Fundamentals 100 Lessons 1-14	ToolingU
	Understand the importance of mathematics for employees in an industrial setting.	Web-Enhanced Lecture	Read/Review Math Fundamentals 100 Lesson 2. Present examples of how math is used in the various aspects of industry.	ToolingU
	Use proper order of operations	Web-Enhanced Lecture	Read/Review Math Fundamentals 100 Lessons 10-12	http://articles.philly.com/2012-03-25/news/31236826_1_skills-gap-tool-makers-manufacturing-skills
	Complete basic addition and subtraction using correct order of operations	Web-Enhanced Lecture	Read/Review Math Fundamentals 100 Lessons 3-5	ToolingU
	Complete basic multiplication and division using the basic functions of a scientific calculator	Web-Enhanced Lecture	Read/Review Math Fundamentals 100 Lessons 6-7	ToolingU
	Demonstrate the use of a scientific calculator in solving problems that involve exponents and root symbols.	Web-Enhanced Lecture	Read/Review Math Fundamentals 100 - Lessons 8-9 and 13.	ToolingU
	Assign timed activity	Web-Enhanced Lecture; Hands-on	Provide students with a number of time cards, or have students complete time cards for the hours they attend various classes. Have students compute how much they should get paid if they were being paid a given amount. Students should calculate the total numbers of hours worked minus breaks, unpaid lunches, etc.	Paper, pencel and calculator
Evaluation	Instructor observations - Time Activity			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 3	**Lesson Plan for:**	Using Fractions and Decimals		
	Session Summary:	This session discussion will familiarize students with the use of fractions, decimals, and percentages for solving problems commonly encountered in an industrial setting.		
	Objectives:	Resolve mathematical equations using fractions, decimals, and percentages. Apply the fundamental properties of fractions to resolve problems including adding, subtracting, multiplying and dividing fractions and mixed numbers. Solve mathematical problems containing the use of decimals. Demonstrate how to convert between decimals, fractions, and percentages		
	Description	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Math: Fractions and Decimals 105 Lessons 1-22	ToolingU
	Define fractions	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lesson 2	ToolingU
	Reduce fractions to lowest	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lesson 3; Fraction Simplification Card Game	http://www.education.com/activity/article/simplest-form/
	Solve addition, subtraction, multiplication, and division problems using fractions	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lessons 4-7	ToolingU
	Compute values using improper factions and mixed numbers	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lessons 8-10	ToolingU
Learning	Using decimals	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lessons 11-12	ToolingU
	Solve addition, subtraction, multiplication, and division problems using decimals	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lessons 13-15	ToolingU
	Identify and use imperfect and repeating decimals	Web-Enhanced Lecture	Read/Review Math: Fractions and Decimals 105 Lessons 16-17	ToolingU
	Convert fractions to decimals, decimals to fractions, and decimals to percentages	Web-Enhanced Lecture; Hands-on	Read/Review Math: Fractions and Decimals 105 Lessons 18-22; Have students use a tape measure to measure a variety of objects in the classroom. Records the measurements in fractions and decimals. Students can also document the percentage of like objects for which they measure.	www.toolingu.com tape measures, various objects to measure including some that are the same
Evaluation	Instructor observations - Object Measurement and Conversion from fractions, decimals and percentages			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 4	**Lesson Plan for:**	Unit Conversion		
	Session Summary:	This session will address how differing units of measurement are used in industry and presents students with the means to convert between different units of measure.		
	Objectives:	Describe the relationship and differences between U.S. and metric units. Apply both U.S. and metric units in solving problems involving length, mass, volume, and area. Convert between various units of measure.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Shop Essentials - Math: Units of Measure 115 Lessons 1-18	ToolingU
	Explain the importance of measurement	Web-Enhanced Lecture	Read/Review Math: Units of Measure 115 Lesson 2	ToolingU
	Identify and use both English and metric measurement systems	Web-Enhanced Lecture	Read/Review Math: Units of Measure 115 Lessons 3-5	ToolingU
	Convert between units within the English system and within the metric system	Web-Enhanced Lecture	Read/Review Math: Units of Measure 115 Lessons 6-10	ToolingU
	Convert between the English and the metric system	Web-Enhanced Lecture; Hands-on	Read/Review Math: Units of Measure 115 Lessons 11-12; have students measure a variety of objects in the classroom using a metric measuring device such as a ruler. Convert the metric measurements into standard units. Ask students to compare how a metric unit compares to a standard unit in relation to size.	www.toolingu.com; various sized objects, metric rules or measuring device.
	Calculate area, volume, mass, and weight using proper units	Web-Enhanced Lecture	Read/Review Math: Units of Measure 115 Lessons 13-16	ToolingU
	Derive various units other measuring from the base units	Web-Enhanced Lecture	Read/Review Math: Units of Measure 115 Lessons 17	ToolingU
Evaluation	Instructor observations - Metric Conversion to Standard Units Activity			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 5	**Lesson Plan for:**	Hole and Surface Dimensions		
	Session Summary:	This session will introduce various structural shapes and angles found on a blueprint and as well as measurement tools and techniques for gauging their accuracy.		
	Objectives:	Determine and measure angles as specified on a blueprint. Demonstrate the skills needed to identify and measure the features of a hole on a print. Discuss the importance of the finish of a surface including the methods available for verifying the surface finish on an object. Translate the finish of surface from a print. Select the proper dimensions of threaded components utilizing the symbols and data available on a print.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Interpreting Blueprints 230 Lessons 1-16	ToolingU
	Demonstrate how to properly reading a blueprint.	Web-Enhanced Lecture	Read/Review Interpreting Blueprints 230 Lessons 2-4	ToolingU
	Describe angles commonly observed on a blueprint and methods of determining the proper angle.	Web-Enhanced Lecture; Hands-on	Read/Review Interpreting Blueprints 230 Lessons 5-6; use an optical comparator to measure angle	www.toolingu.com; optical comparator
	Investigate types of holes and apply proper methods for ensuring accuracy of the hole.	Web-Enhanced Lecture; Hands-on	Read/Review Interpreting Blueprints 230 Lessons 7-8; use a caliper or wire gage to measure the diameter of a hole.	www.toolingu.com; caliper or wire gage
	Interpret and practice techniques for checking a corner radius on a part.	Web-Enhanced Lecture; Hands-on	Read/Review Interpreting Blueprints 230 Lessons 9-10; use a radius gage to measure the radius of various parts	www.toolingu.com; radius gage
	Identify various surface finishes and measure the finish to ensure compliance with specified standards.	Web-Enhanced Lecture; Hands-on	Read/Review Interpreting Blueprints 230 Lessons 11-12; use a profilometer to measure the surface of various parts	www.toolingu.com; profilometer
	Identify thread specifications and proper methods of measuring inner and outer diameter threads	Web-Enhanced Lecture	Read/Review Interpreting Blueprints 230 Lesson 16	ToolingU
Evaluation	Instructor observations - Have student measure various components and record their results for angle measurement, hole diameter, radius, surface finish, and thread identification.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 6	**Lesson Plan for:**	Tolerance		
	Session Summary:	This session will discuss tolerance as it applies to manufactured parts and how one can interpret tolerance specifications.		
	Objectives:	Explain the term tolerance and specify its importance in the manufacturing of parts and materials. Compute the minimum and maximum tolerances of various components using fractions and decimals. Specify the various means that tolerance can be indicated on a print.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Basics of Tolerance 120 Lessons 1-12	ToolingU
	Identify common tolerances used in a manufacturing environment.	Web-Enhanced Lecture	Read/Review Basics of Tolerance 120 Lessons 2-6	ToolingU
	Determine tolerances for various methods and materials.	Web-Enhanced Lecture; Hands-on	Read/Review Basics of Tolerance 120 Lessons 7-8; use a general blueprint and have students identify and determined tolerances of various components on the blueprint.	www.toolingu.com general blueprint from internet example
	Compare and contrast dimensions and tolerance	Web-Enhanced Lecture	Read/Review Basics of Tolerance 120 Lessons 9-12	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 7	**Lesson Plan for:**	Geometric Dimensioning and Tolerance (GD&T)		
	Session Summary:	This session will define the term geometric dimensioning and tolerance (GD&T) and outline the key features of GD&T.		
	Objectives:	Define the terms geometric dimensioning and tolerance and datum. Discuss the advantages and disadvantages of using GD&T. Identify the main classes of tolerances used in GD&T		
Learning	Description	Delivery Method	Activity	Materials
	ToolingU Reading Assignment	Online learning	Inspection - Intro to GD&T 200 Lessons 1-20	ToolingU
	Explain GD&T and the GD&T standards	Web-Enhanced Lecture	Read/Review Intro to GD&T 200 Lessons 2-3, also available in Intro to GD&T 205 (2009).	ToolingU
	Define datum and how datums are identified and used in the manufacturing of parts.	Web-Enhanced Lecture	Read/Review Intro to GD&T 200 Lessons 4-7	ToolingU
	Discuss the major categories of geometric tolerances	Web-Enhanced Lecture	Read/Review Intro to GD&T 200 Lessons 8-17	ToolingU
	Describe the advantages and disadvantages of GD&T.	Web-Enhanced Lecture	Read/Review Intro to GD&T 200 Lessons 18-20	ToolingU
Evaluation	Quiz testing the concepts			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	Introduction to Quality and Continuous Improvement			
Session 8	**Lesson Plan for:**	Introduction to Geometry		
	Session Summary:	This session presents an overview of geometry and generalized rules to using geometry in measurements.		
	Objectives:	Explain the term geometry. Properly name common shapes found in an industrial setting and list their key features. Identify points, rays, perpendicular and parallel lines, and types of angles. Describe the key features of a circle.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Shop Geometry Overview 170 Lessons 1-20	ToolingU
	Describe the term geometry	Web-Enhanced Lecture	Read/Review Shop Geometry Overview 170 Lesson 2	ToolingU
	Describe the basic characteristics of common geometric shapes.	Web-Enhanced Lecture	Read/Review Shop Geometry Overview 170 Lessons 3-4	ToolingU
	Discuss types of angles,intersection lines, and parallel lines	Web-Enhanced Lecture; Hands-on	Read/Review Shop Geometry Overview 170 Lessons 5-8, have students draw and measure various angles on paper and on a miscellaneous part found in the classroom	ToolingU
	Describe the basic characteristics of a triangle and the features of various types of triangles.	Web-Enhanced Lecture	Read/Review Shop Geometry Overview 170 Lessons 10-12	ToolingU
	Explain how the characteristics of geometric shapes can be utilized to produce parts.	Web-Enhanced Lecture	Read/Review Geometry Overview 170 Lessons 9, 13-16	ToolingU
	Describe the parts of a circle while identify critical features that can be used to promotes proper manufacturing.	Web-Enhanced Lecture	Read/Review Shop Geometry Overview 170 Lessons 17-20	ToolingU
Evaluation	Instructor observations - Student measurement and sketching of geometric shape			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 9	**Lesson Plan for:**	Line and Angles		
	Session Summary:	This session describes the properties of lines and angles and characteristics that can be used to determine measurements.		
	Objectives:	Identify lines, line segments, rays, and angles. Classify angles as being acute, right, obtuse, or straight. Discuss complementary and supplementary angles and lines. Compute measures of angles and lines.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Shop Essentials - Geometry Lines and Angles 155 Lessons 1-18	ToolingU
	Decribe various types of angles and the relationships between angles.	Web-Enhanced Lecture	Read/Review Geometry Lines and Angles 155 Lessons 2-6	ToolingU
	investigate shapes with parallel and perpendicular sides and lines.	Web-Enhanced Lecture	Read/Review Geometry Lines and Angles 155 Lessons 7-8	ToolingU
	Describe situations that do (theorums) and do not (axioms) require proof.	Web-Enhanced Lecture	Read/Review Geometry Lines and Angles 155 Lesson 9	ToolingU
	Using geometry to solve mathematical problems.	Web-Enhanced Lecture	Read/Review Geometry Lines and Angles 155 Lessons 10-18	ToolingU
Evaluation	Instructor observations, assign			

egree/Diploma:		Diversified Manufacturing Technology		
Course:		Introduction to Quality and Continuous Improvement		
Session 10	Lesson Plan for:	Triangles		
	Session Summary:	This session will describe the various types of triangles and their use in solving manufacturing problems.		
	Objectives:	Categorize triangles by their sides and angles. Determine the measurement of sides and angles using mathematical relationships. Solve industrial problems using triangles.		
	Description	Delivery Method	Activity	Materials
	ToolingU Reading Assignment	Online learning	Shop Essentials - Geometry: Triangles 165 Lessons 1-16	ToolingU
	Identify the characteristics of a a triangle and how a student can use those angles to determine lengths and other characteristics of a shape.	Web-Enhanced Lecture	Read/Review Geometry: Triangles 165 Lessons 2-5, review math open resource	http://www.mathopenref.com/trianglesolving.html
Learning	Use the sides and angles of a triangle to establish the correct shape.	Web-Enhanced Lecture	Read/Review Geometry: Triangles 165 Lessons 6-10	ToolingU
	Calculating the area of triangle	Web-Enhanced Lecture	Read/Review Geometry: Triangles 165 Lessons 11	ToolingU
	Solving problems using right triangles	Web-Enhanced Lecture	Read/Review Geometry: Triangles 165 Lessons 12-16	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 11	**Lesson Plan for:**	Circles and Polygons		
	Session Summary:	This session will explain the use of circles and polygons to conduct measurements of manufactured parts and prints.		
	Objectives:	Explain the terminology of a circle including radius, center, chord, area, circumference, tangent and secant. Apply methods of measuring the circumference and area of a circle. Identify and measure central and inscribed angles in a circle. Identify types of polygons. Solve problems involving circles and polygons.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Shop Essentials - Geometry: Circles and Polygons 185 Lessons 1-16	ToolingU
	Identify, measure, and calculate the radius, diameter, circumference, and area of a circle	Web-Enhanced Lecture; Hands-on	Read/Review Geometry: Circles and Polygons 185 Lessons 2-5; have students complete a worksheet in which they solve calculations given radius, diameter, and area. Student can also measure circular objects to determine these components.	http://www.mathatube.com/circle-diameter-area-radius-worksheets.html
	Describe and use features of circles to solve problems	Web-Enhanced Lecture	Read/Review Geometry: Circles and Polygons 185 Lessons 6-8	ToolingU
	Describe the characteristic tangent and how it can be used to solve problems.	Web-Enhanced Lecture	Read/Review Geometry: Circles and Polygons 185 Lessons 9-11	ToolingU
	Identifyhow polygons can be used to solve problems.	Web-Enhanced Lecture	Read/Review Geometry: Circles and Polygons 185 Lessons 12-16	ToolingU
Evaluation	Instructor observations - Worksheets solving for radius, diameter and circumference of a circle			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 12	**Lesson Plan for:**	Surface Measurement		
	Session Summary:	This session discusses various surfaces and finishes and their use in parts production.		
	Objectives:	Explain the effects of various machining process on the finish of a surface. Differentiate between texture, flaw, lay, roughness, and waviness. Compare the importance of surface finish on mobile and immobile parts. Discuss how the finish of a surface effects its functionality and cost. Demonstrate the tools and methods commonly used to measure surface finish.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Inspection - Surface Measurement 140 Lessons 1-18	ToolingU
	Recognize the importance of surface finishes on parts usage and cost.	Web-Enhanced Lecture	Read/Review Surface Measurement 140 Lessons 2, 5, 6 and 17	ToolingU
	Understand what is meant by static and dynamic surfaces.	Web-Enhanced Lecture	Read/Review Surface Measurement 140 Lessons 3-4	ToolingU
	Recognize various surface flaws, roughness, lay, waviness	Web-Enhanced Lecture	Read/Review Surface Measurement 140 Lessons 7-11	ToolingU
	Demonstrate how to measure surface finishes using various instruments and gages	Web-Enhanced Lecture	Read/Review Surface Measurement 140 Lessons 12-15	ToolingU
	Demonstrate how to properly calibrate surface measurement instruments	Web-Enhanced Lecture	Read/Review Surface Measurement 140 Lessons 16-18	ToolingU
Evaluation	Instructor observation of use of surface measuring devices on object scratches if available, quiz over concepts if no tools are available.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 13	**Lesson Plan for:**	Thread and Fasteners		
	Session Summary:	This session will describe various types and parts of a thread and how they are used in an industrial setting.		
	Objectives:	Define and label the parts of a screw thread. List the various forms of screw thread. Identify left and right handed threads, screw head types, and classifications using ANSI and manufacturer standards. Discuss the various processes used to construct threads. Explain the key uses for the various types of threads.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Overview of Threads 150 Lessons 1-18	ToolingU
	Identify types of treads and the key features of threads.	Web-Enhanced Lecture; Hands-on	Read/Review Overview of Threads 150 Lessons 2-4, have students identify and measure various types and styles of screws and their uses	http://store.curiousinventor.com/guides/Metal_Working/Screws/
	Describe how to determine the pitch, diameter, start, and lead of a tread.	Web-Enhanced Lecture	Read/Review Overview of Threads 150 Lessons 5-7	ToolingU
	Describe how variuos threads are manufactured.	Web-Enhanced Lecture	Read/Review Overview of Threads 150 Lessons 8-12	ToolingU
	Discuss applicable standards and thread requirements.	Web-Enhanced Lecture	Read/Review Overview of Threads 150 Lessons 13-14	ToolingU
	Demonstrate the proper means to measure threads.	Web-Enhanced Lecture	Read/Review Overview of Threads 150 Lessons 15-18	ToolingU
Evaluation	Instructor observations - Students identify various types of threads and conduct thread measurements.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 14	**Lesson Plan for:**	Basics of Precision Measurement		
	Session Summary:	This session introduces the basic tools and equipment used to ensure quality.		
	Objectives:	Explain the term standardization as it pertains to measurements. Demonstrate the relationship between accuracy and precision. Discuss the importance of instrument calibration and sensitivity as it pertains to quality. Illustrate how to properly inspect materials for accuracy and precision.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Basic Measurement 110 Lessons 1-18	ToolingU
	Distinguish between gaging and inspection	Web-Enhanced Lecture	Read/Review Basic Measurement 110 Lessons 2-3	ToolingU
	Distinguish between accuracy and precision.	Web-Enhanced Lecture; Hands-on	Read/Review Basic Measurement 110 Lesson 4; Have students measure an item such as their desk top or other item. Have them compare their measurement with three or four other students recording one another's results. Students can then determine deviation, percent error, and such	ToolingU
	Explain the term sensitivity and how it applies to measurements and measureing devices.	Web-Enhanced Lecture	Read/Review Basic Measurement 110 Lesson 5	ToolingU
	Demonstrate the proper use of various measuring devices.	Web-Enhanced Lecture; Hands-on	Read/Review Basic Measurement 110 Lessons 6-16; Have students measure various items using a variety of measuring devices such as calipers, gages, etc.	www.toolingu.com; various measuring tools, various items to measure
	Discuss what is meant by calibration and why it is important.	Web-Enhanced Lecture	Read/Review Basic Measurement 110 Lessons 17-18	ToolingU
Evaluation	Instructor observations - Report on team activities and results			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 15	**Lesson Plan for:**	Coordinating Measurement Machine (CMM)		
	Session Summary:	This session will discuss coordinate measuring machines and their uses.		
	Objectives:	Discuss how a CMM can be used for measuring the physical characteristics of parts. Explain the primary parts and how a CMM works including its advantages and disadvantages. Describe how the Cartesian coordinate system is used for part alignment and measurement.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Inspection - Basics of CMM 120 Lessons 1-16	ToolingU
	Describe what a CMM is and types of CMM's.	Web-Enhanced Lecture	Read/Review Basics of CMM 120 Lessons 2, 4, 15	ToolingU
	Discuss the main components of a CMM.	Web-Enhanced Lecture	Read/Review Basics of CMM 120 Lessons 3, 10-14	ToolingU
	Describe the features of the the Cartesian coordinate system.	Web-Enhanced Lecture	Read/Review Basics of CMM 120 Lessons 5-7	ToolingU
	Describe how to properly align materials when using a CMM	Web-Enhanced Lecture	Read/Review Basics of CMM 120 Lessons 8-9	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 16	**Lesson Plan for:**	Optical Comparators		
	Session Summary:	This session explains the how, what, and why ofusing optical comparators for inspection purposes.		
	Objectives:	Explain the purpose of an optical comparator and the key components of the device. Identify the different types of optical comparators and their advantages and disadvantages. Describe the properties of light waves and how mirrors affect the light path. Discuss charting in relation to the use of optical comparators.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Basics of Optical Comparators 130 Lessons 1-16	ToolingU
	Describe what is meant by optical inspection and common devices found in industry.	Web-Enhanced Lecture	Read/Review Basics of Optical Comparators 130 Lessons 2, 4-5	ToolingU
	Describe the properties of light waves.	Web-Enhanced Lecture; Hands-on	Read/Review Basics of Optical Comparators 130 Lesson 3; have students perform various activities using different mediums to explore the properties of light waves.	http://micro.magnet.fsu.edu/optics/activities/teachers/properties.html
	Identify the critical parts of the optical comparator.	Web-Enhanced Lecture	Read/Review Basics of Optical Comparators 130 Lessons 6-8, 10-11	ToolingU
	Discuss the use of mirrors and light waves in magnification of parts.	Web-Enhanced Lecture	Read/Review Basics of Optical Comparators 130 Lesson 9	ToolingU
	Identify the advantages and disadvantages of optical comparators.	Web-Enhanced Lecture	Read/Review Basics of Optical Comparators 130 Lessons 14-16	ToolingU
Evaluation	Laboratory report describing the outcomes of the effects of differing mediums on light waves.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 17	**Lesson Plan for:**	Linear Instruments and Quality		
	Session Summary:	This session describes the term linearity and how various measuring devices use linearity to ensure quality.		
	Objectives:	Define the term linear instrument and provide examples. Discuss the cause and effect of types of errors in measurement Explain how stability, linearity, resolution, amplification, and hysteresis affect results. Explain the contrast between resolution, precision, and accuracy in measurement.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Linear Instrument Characteristics 115 Lessons 1-15	ToolingU
	Describe commonly used linear measurements	Web-Enhanced Lecture	Read/Review Linear Instrument Characteristics 115 Lesson 2	ToolingU
	Discuss types of errors commonly found when using linear instruments.	Web-Enhanced Lecture	Read/Review Linear Instrument Characteristics 115 Lessons 3-6	ToolingU
	Explain how linearity is measured and why it is commonly used in manufacturing.	Web-Enhanced Lecture	Read/Review Linear Instrument Characteristics 115 Lessons 8-12	ToolingU
	Perform linear measurements on objects and outlines key characteristics identified.	Web-Enhanced Lecture; Hands-on	Read/Review Linear Instrument Characteristics 115 Lessons 7, 13-15; have students perform linear measurement on common objects found in the classroom. Students can then identify common sources of errors that may be part of their measurement	www.toolingu.com; tape measure or rules, random linear objects
Evaluation	Instructor observations involving linear measurements and measurement errors			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 18	**Lesson Plan for:**	Instrument Calibration		
	Session Summary:	This session describes the importance of tool and machine calibration and the associated national standards.		
	Objectives:	Explain the significance of instrument calibration Describe measurement uncertainty and significant figures. Discuss national and internal standards Communicate the requirements of product and standard traceability Introduce ISO 9000 concepts		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Calibration Fundamentals 210 Lessons 1-20	ToolingU
	Explain calibration and its importance.	Web-Enhanced Lecture	Read/Review Calibration Fundamentals 210 Lesson 2	ToolingU
	Explain how and why calibratrion standards are used.	Web-Enhanced Lecture	Read/Review Calibration Fundamentals 210 Lessons 3-4	ToolingU
	Discuss the how ISO 9000 and tracability standards apply to quality.	Web-Enhanced Lecture	Read/Review Calibration Fundamentals 210 Lessons 5-8	ToolingU
	Discuss howmeasurement uncertainty and errors affect quality.	Web-Enhanced Lecture	Read/Review Calibration Fundamentals 210 Lessons 9-11	ToolingU
	Describe the steps necessary to insure proper calibration.	Web-Enhanced Lecture	Read/Review Calibration Fundamentals 210 Lessons 12-13	ToolingU
	Describe the proper recordkeeping and reporting requirements for internal and external calibrations.	Web-Enhanced Lecture	Read/Review Calibration Fundamentals 210 Lessons 14-20	ToolingU
Evaluation	Instructor assigned quiz over concepts			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 19	**Lesson Plan for:**	Coordinate Measuring Machine (CMM)		
	Session Summary:	This session will revisit CMMs and further investigate their advantages and disadvantages in an industrial setting.		
	Objectives:	Explain the purpose of a coordinate measuring machine (CMM) and the key components of the device. Illustrate how to identify and use the working plane and associated coordinate axis. Identify the different types of coordinate measuring machines and their intended use. Discuss the basic software functionality and the advantages and disadvantages of the device.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Inspecting with CMMs 220 Lessons 1-17	ToolingU
	Differentiate between types of CMMs and provide how each type might apply to differing situations.	Web-Enhanced Lecture	Read/Review Inspecting with CMMs 220 Lessons 2-3, 16	ToolingU
	Discuss how CMMs address external influences and sources of error.	Web-Enhanced Lecture	Read/Review Inspecting with CMMs 220 Lessons 4-5	ToolingU
	Describe the connection between a CMMs working planes and axes as it related to the Cartesian coordinating system.	Web-Enhanced Lecture	Read/Review Inspecting with CMMs 220 Lessons 6-7	ToolingU
	Explain how the parts of the CMM function including the software.	Web-Enhanced Lecture	Read/Review Inspecting with CMMs 220 Lessons 8-14	ToolingU
	Demonstrate how to program and use a CMM.	Web-Enhanced Lecture	Read/Review Inspecting with CMMs 220 Lessons 15, 17	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 20	**Lesson Plan for:**	Using Optical Comparators		
	Session Summary:	This session revisits in greater detail optical comparators and conditions for use.		
	Objectives:	Investigate in great detail optical comparator instruments and factors that affect the quality of measurement. Illustrate how to use an optical comparator including parts illumination, screen rotation, and chart motion. Describe the steps necessary to accurately and precisely complete measurements. Communicate the proper maintenance and calibration factors necessary to ensure correct operation of the device.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Inspection - Inspecting with Optical Comparators 230 Lessons 1-19	ToolingU
	Discuss how an optical comparator works	Web-Enhanced Lecture	Read/Review Inspecting with Optical Comparators 230 Lessons 2-4, 6-8	ToolingU
	Compare and contrast digital and manual comparitors.	Web-Enhanced Lecture	Read/Review Inspecting with Optical Comparators 230 Lessons 5, 7-9	ToolingU
	Learn to interprest optical comparator charts and scales.	Web-Enhanced Lecture	Read/Review Inspecting with Optical Comparators 230 Lessons 10-11	ToolingU
	Determine how to proper align parts for measurement when using an optical comparator.	Web-Enhanced Lecture	Read/Review Inspecting with Optical Comparators 230 Lessons 12-13	ToolingU
	Conduct measurements by using the various functionalities of an optical comparator such as screen rotation and such.	Web-Enhanced Lecture	Read/Review Inspecting with Optical Comparators 230 Lessons 14-16	ToolingU
	Review proper maintenance procedures for ensuring the proper functioning of an optical comparator.	Web-Enhanced Lecture	Read/Review Inspecting with Optical Comparators 230 Lessons 17-19	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 21	**Lesson Plan for:**	Quality Overview		
	Session Summary:	This session outlines roles and responsibilities of each individual within a company's supply chain for ensuring quality products.		
	Objectives:	Establish what is meant by the term "quality" and its relationship to customer service. Discuss the long and short-term effects of quality on both the business and the customer. Define "customer" both internal and external to the company. Present the links between the hierarchy of a company and quality.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Quality - Quality Overview 100 Lessons 1-16	ToolingU
	Define quality and how it pertains to customer satisfaction.	Web-Enhanced Lecture	Read/Review Quality Overview 100 Lessons 2-4;	ToolingU
	Differentiate between internal and external customers and the role each plays in ensuring quality products.	Web-Enhanced Lecture; Hands-on	Read/Review Quality Overview 100 Lessons 7-8; provide students with a scenario in which the learner is to select a role within a company and, within that role, to consider who their customers are and for whom they are the customer. Students will then write a report of their findings.	ToolingU
	Discuss what is meant by a quality process and product.	Web-Enhanced Lecture; Hands-on	Read/Review Quality Overview 100 Lessons 5-6 and 10-12; have students evaluate their perception of the two products. Students can then evaluate how customer perceptions affect quality.	www.toolingu.com; two comparative products
	Compare and contrast the characteristics of a company that promotes quality and those that simply assume quality.	Web-Enhanced Lecture	Read/Review Quality Overview 100 Lessons 13-16	ToolingU
Evaluation	Instructor assigned homework - Internal/External Customer report			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 22	**Lesson Plan for:**	ISO 9000		
	Session Summary:	This session will introduce ISO 9000 concepts and its effects on quality and continuous improvement.		
	Objectives:	Introduce ISO 9000 and it benefits to businesses. Discuss the key principles of ISO 9000 Discuss the role and expectations of all employees in maintaining a quality management system and complying with ISO 9000 Outline what a quality management system (QMS) is and critical components of the system. Describe how ISO 9000 and QMS can be implemented to improve the quality at all stages of operations.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - ISO 9000 Overview 110 Lessons 1-19	ToolingU
	Explain ISO 9000 and describe the role of the International Organization for Standardization.	Web-Enhanced Lecture; Hands-on	Read/Review ISO 9000 Overview 110 Lessons 2-3; have students interview a company that is ISO 9000 certified and prepare a written report of how the company addresses the six key ISO 9000 criteria.	ToolingU
	Describe the key components of ISO 9000 and how such a standard promotes quality.	Web-Enhanced Lecture	Read/Review ISO 9000 Overview 110 Lessons 4-6	ToolingU
	Building and understanding of stakeholders responsibilities in promoting and achieving ISO 9000 standards.	Web-Enhanced Lecture	Read/Review ISO 9000 Overview 110 Lessons 7-10	ToolingU
	Discuss quality management systems and how they are used in industry.	Web-Enhanced Lecture	Read/Review ISO 9000 Overview 110 Lessons 11-13	ToolingU
	Introduce advantages in implementing ISO 9000 within a company.	Web-Enhanced Lecture	Read/Review ISO 9000 Overview 110 Lessons 13-16	ToolingU
	Discuss the importance of internal and external audits and how the finding promote continuous improvmement.	Web-Enhanced Lecture	Read/Review ISO 9000 Overview 110 Lessons 17-19	ToolingU
Evaluation	Instructor observations - Examination of a written report			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 23	**Lesson Plan for:**	Six Sigma		
	Session Summary:	This session introduces the fundamentals of Six Sigma and critical components, methodologies, and terminology used by companies working to achieve six sigma status.		
	Objectives:	Introduce six sigma methodology and how it applies to day-to-day operations. Present tools and techniques used to improve upon product defects. Describe factors that contribute to defects and methods to detect and correct various causes. Discuss the roll of employees in promoting and using six sigma.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Quality - Intro to Six Sigma 170 Lessons 1-16	ToolingU
	Define Six Sigma and its history.	Web-Enhanced Lecture	Read/Review Intro to Six Sigma 170 Lessons 1-3	ToolingU
	Describe critical roles and responsibilities for six sigma.	Web-Enhanced Lecture	Read/Review Intro to Six Sigma 170 Lessons 4-5	ToolingU
	Introduce process variation and defects that contribute to low quality and means to identify and correct their root cause.	Web-Enhanced Lecture; Hands-on	Read/Review Intro to Six Sigma 170 Lessons 6-8; have teams of students conduct a root cause analysis of a safety incident or process failure. Student should also prepare a plan addressing corrective action.	ToolingU
	Distinguish between types of data and importance of data in ensuring continuous improvement.	Web-Enhanced Lecture	Read/Review Intro to Six Sigma 170 Lessons 9-11	ToolingU
	Introduction to DMAIC.	Web-Enhanced Lecture	Read/Review Intro to Six Sigma 170 Lessons 12-16	ToolingU
Evaluation	Instructor observations - Evaluation of root cause analysis			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 24	**Lesson Plan for:**	Lean Manufacturing		
	Session Summary:	This session will describe the basic principles of lean manufacturing.		
	Objectives:	Introduce the history and concepts of lean manufacturing. Recognize the eight primary types of waste within a facility. Differentiate between lean manufacturing and mass production. Discuss the primary lean principles and their benefits. Demonstrate how the use of lean principle relations to six sigma and defect minimization.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Quality - Lean Manufacturing Overview 130 Lessons 1-18	ToolingU
	Describe the components of lean manufacturing	Web-Enhanced Lecture	Read/Review Lean Manufacturing Overview 130 Lesson 2	ToolingU
	Identify types of wastes and describe their effect on production costs	Web-Enhanced Lecture	Read/Review Lean Manufacturing Overview 130 Lessons 3-4	ToolingU
	Discuss the advantages of lean manufacturing to various types of production.	Web-Enhanced Lecture; Hands-on	Read/Review Lean Manufacturing Overview 130 Lessons 5-7; have students build an object using Legos or Kinex applying lean principles.	www.toolingu.com; Legos/Kinex
	Explain the importance of reducing product changeover times, reducing inventory, continuous product flow.	Web-Enhanced Lecture	Read/Review Lean Manufacturing Overview 130 Lessons 8-10	ToolingU
	Explain how a pull systems works and in the use of cells in process optimization.	Web-Enhanced Lecture	Read/Review Lean Manufacturing Overview 130 Lessons 11-12	ToolingU
	Describe means to reduce process variation and error detection.	Web-Enhanced Lecture	Read/Review Lean Manufacturing Overview 130 Lessons 13-15	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 25	**Lesson Plan for:**	Total Quality Management		
	Session Summary:	This session will define and discuss the principles of TQM.		
	Objectives:	Define Total Quality Management (TQM). Identify keys to total quality success. Outline approached to total quality implementation. Discuss the relationship between quality and business competitiveness. Explain common roadblock to achieving total quality.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Quality - Approached to Quality Management 255 Lessons 1-14	ToolingU
	Describe key characteristics of product quality and their relationship to TQM	Web-Enhanced Lecture	Read/Review Approached to Quality Management 255 Lesson 2	ToolingU
	Describe common factors that affect quality.	Web-Enhanced Lecture	Read/Review Approached to TQM 255 Lessons 3-6	ToolingU
	Distinguish how TQM can be applies to various stages of production.	Web-Enhanced Lecture	Read/Review Approached to TQM 255 Lessons 7-9	ToolingU
	Identify tools and methods for implementing and sustaining TQM.	Web-Enhanced Lecture	Read/Review Approached to TQM 255 Lessons 10-11	ToolingU
	Discuss the difficulties in fully implementing TQM.	Web-Enhanced Lecture	Read/Review Approached to TQM 255 Lessons 12-14	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 26	**Lesson Plan for:**	Concepts of "5S"		
	Session Summary:	This session provides an introduction to the 5S quality system and describes techniques for implementing 5S.		
	Objectives:	Introduce "5S" Describe the purpose and benefits of "5S" Discuss the five phases of its process and the key objectives, tools, and methods use to achieve each phase.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Quality - Intro to 5S 155 Lessons 1-14	ToolingU
	Describe the 5S concept.	Web-Enhanced Lecture	Read/Review Intro to 5S 155 Lesson 2	ToolingU
	Describe how 5S can improve quality and production.	Web-Enhanced Lecture	Read/Review Intro to 5S 155 Lessons 3-5	ToolingU
	Outline the steps of 5s	Web-Enhanced Lecture; Hands-on	Read/Review Intro to 5S 155 Lessons 6-11; complete the 5S numbers game	http://www.superteams.com/5s-game.php
	Discuss the advantages and disadvantages of 5S	Web-Enhanced Lecture	Read/Review Intro to 5S 155 Lessons 12-14	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 27	**Lesson Plan for:**	Quality Control of Holes		
	Session Summary:	This session will explain the use and measurement of holes in various product applications.		
	Objectives:	Discuss the importance of quality control as related to product holes. Demonstrate examples of good and poor quality in relation to the roundness of holes. Introduce various instruments and their use in ensuring quality compliance for holes.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Hole Inspection 240 Lessons 1-20	ToolingU
	Explain how to use various tools to gage and inspect holes.	Web-Enhanced Lecture	Read/Review Hole Inspection 240 Lessons 2-3	ToolingU
	Identify out of round conditions	Web-Enhanced Lecture	Read/Review Hole Inspection 240 Lesson 4	ToolingU
	Identify contact and non-contact types of instruments.	Web-Enhanced Lecture	Read/Review Hole Inspection 240 Lessons 5-6	ToolingU
	Identify and demonstrate the use various types of instruments.	Web-Enhanced Lecture	Read/Review Hole Inspection 240 Lessons 7-18	ToolingU
	Identy the hows and why of using various measurement tools.	Web-Enhanced Lecture	Read/Review Hole Inspection 240 Lessons 19-20	ToolingU
Evaluation	Instructor observation of instrument use			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 28	**Lesson Plan for:**	Threads		
	Session Summary:	This session will provide greater detail information regarding the selection and use of thread measurement devices.		
	Objectives:	Introduce types of threads. Compare and contract thread characteristics. Examine various tools and techniques used to measure and inspect threads. Familiarize students with various thread gages and measurement techniques.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Inspection - Thread Inspection 250 Lessons 1-19	ToolingU
	Describe the criteria necessary for selecting the proper tools used for measuring and inspecting threads.	Web-Enhanced Lecture	Read/Review Thread Inspection 250 Lessons 2-4	ToolingU
	Describe and identify various thread characteristics	Web-Enhanced Lecture	Read/Review Thread Inspection 250 Lessons 5-6	ToolingU
	Describe the importance of thread inspections as it pertains to mating and interlocking parts.	Web-Enhanced Lecture	Read/Review Thread Inspection 250 Lesson 7	ToolingU
	Identify and demonstrate various thread inspection tools.	Web-Enhanced Lecture	Read/Review Thread Inspection 250 Lessons 8-19	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 29	**Lesson Plan for:**	Hardness Testing		
	Session Summary:	This session introduces material hardness, hardness testing, and understanding hardness ratings.		
	Objectives:	Define material hardness. Explain the operation of common industrial hardness testing including Brinell, Vickers, and Rockwell. Discuss the benefits and challenges of hardness testing.		
	Description	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Hardness Testing 260 Lessons 1-18	ToolingU
	Define hardness	Web-Enhanced Lecture	Read/Review Hardness Testing 260 Lesson 2	ToolingU
	Describe the Rockwell hardness test, scaling, and superficial testing	Web-Enhanced Lecture	Read/Review Hardness Testing 260 Lessons 3-5	ToolingU
Learning	Describe Brinell testing	Web-Enhanced Lecture	Read/Review Hardness Testing 260 Lessons 6-7	ToolingU
	Describe Vickers testing	Web-Enhanced Lecture	Read/Review Hardness Testing 260 Lesson 8	ToolingU
	Describe other types of testing	Web-Enhanced Lecture	Read/Review Hardness Testing 260 Lessons 9-15	ToolingU
	Convert hardness data and identify errors in hardness testing	Web-Enhanced Lecture	Read/Review Hardness Testing 260 Lessons 16-18	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 30	**Lesson Plan for:**	Geometric Dimensioning and Tolerancing (GD&T) Continued		
	Session Summary:	This session expands upon the rules of GD&T and their application to print reading. This class references the 1994 standard.		
	Objectives:	Review the eight key terms associated with GD&T. Define datum and dimensioning. Introduce GD&T Rules 1 and 2 with respect to individual tolerance, datum reference, or both. Explain the "Rule 321" as it pertains to GD&T.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Interpreting GD&T 310 Lessons 1-20	ToolingU
	Describe GD&T terminology such as ASMA Y 14.5M	Web-Enhanced Lecture	Read/Review Interpreting GD&T 310 Lessons 2-3	ToolingU
	Define GD&T rules 1 and 2	Web-Enhanced Lecture	Read/Review Interpreting GD&T 310 Lessons 4-7	ToolingU
	Identify virtual and resultant conditions	Web-Enhanced Lecture	Read/Review Interpreting GD&T 310 Lessons 8-11	ToolingU
	Investigate datum's and GD&T	Web-Enhanced Lecture	Read/Review Interpreting GD&T 310 Lessons 12-16	ToolingU
	Distinguish between various GD&T dimensioning rules	Web-Enhanced Lecture	Read/Review Interpreting GD&T 310 Lessons 17-20	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 31	**Lesson Plan for:**	Statistical Analysis		
	Session Summary:	This session will introduce students to basic statistics and how statistics are used in a manufacturing setting.		
	Objectives:	Define statistics and common uses in industry. Familiarize students with identifying data ranges, mean, median and mode. Demonstrate how to determine standard deviation. Acquaint students with developing and interpreting quality charts including histograms, line graphs, and bell curves.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Statistics 220 Lessons 1-18	ToolingU
	Describe statistics	Web-Enhanced Lecture	Read/Review Statistics 220 Lessons 2-4	ToolingU
	List common uses for statistics	Web-Enhanced Lecture	Read/Review Statistics 220 Lesson 5	ToolingU
	Calculate mean, median, mode, and range	Web-Enhanced Lecture; Hands-on	Read/Review Statistics 220 Lessons 6-9, 13; complete the 3 M Olympics	http://www.nsa.gov/academia/_files/collected_learning/middle_school/number-sense/3m_olympics.pdf
	Create and interpret histograms and bell shape curves	Web-Enhanced Lecture	Read/Review Statistics 220 Lessons 10-12	ToolingU
	Calculate standard deviation	Web-Enhanced Lecture	Read/Review Statistics 220 Lessons 14-18	ToolingU
Evaluation	Instructor observations - Evaluation students results from the 3M Olympics Activity Sheets			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 32	**Lesson Plan for:**	Statistical Process Control		
	Session Summary:	This session will introduce students to statistical process control.		
	Objectives:	Describe the concept of statistical process control (SPC). Determine how customer requirements relate to the establishment of control limits. Discuss the concept of process variation and how it can be described statistically through the use of control charts. Illustrate in-control and out-of-control process and its effect on quality.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - SPC Overview 210 Lessons 1-16	ToolingU
	Define statistical process control and how it relates to customer requirements.	Web-Enhanced Lecture	Read/Review SPC Overview 210 Lessons 2-5	ToolingU
	Describe the purpose of control charts and how control limits get established.	Web-Enhanced Lecture	Read/Review SPC Overview 210 Lessons 6-7	ToolingU
	Interpret various types of control charts.	Web-Enhanced Lecture	Read/Review PC Overview 210 Lessons 8-11	ToolingU
	Distinguish between process capability and process control.	Web-Enhanced Lecture	Read/Review SPC Overview 210Lesson 12	ToolingU
	Define an in-control and out-of-control process and how it contributes to process improvements.	Web-Enhanced Lecture	Read/Review SPC Overview 210 Lessons 13-16	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 33	**Lesson Plan for:**	Product Sampling and Measurement		
	Session Summary:	This session will expand upon previous sections on TQM by focusing on measurement and implementation of TQM.		
	Objectives:	Introduce the importance of product sampling and sample size. Define common terminology used in sampling. Depict how to use sample tables to determine sample size. Discuss the effects of sample size on product and process quality. Establish methods of measuring sample size.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Managing Practices for Total Quality 320 Lessons 1-14	ToolingU
	Review the role on TQM and in implementation in various cycles of industry.	Web-Enhanced Lecture	Read/Review Managing Practices for Total Quality 320 Lessons 2-3	ToolingU
	Define the roles and responsiblities of managements in TQM implementation.	Web-Enhanced Lecture	Read/Review Managing Practices for Total Quality 320 Lesson 4	ToolingU
	Explain the importance of incoming material control	Web-Enhanced Lecture	Read/Review Managing Practices for Total Quality 320 Lessons 5-6	ToolingU
	Choose and use proper tables for determining sampling size and requirements.	Web-Enhanced Lecture	Read/Review Managing Practices for Total Quality 320 Lesson 7	ToolingU
	List key factors for measuring product quality.	Web-Enhanced Lecture	Read/Review Managing Practices for Total Quality 320 Lessons 8-9	ToolingU
	Identify and use method of measuring TQM results.	Web-Enhanced Lecture	Read/Review Managing Practices for Total Quality 320 Lessons 10-14	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 34	**Lesson Plan for:**	Basic Algebra		
	Session Summary:	This session will review basic algebra and how to solve algebraic expressions.		
	Objectives:	Evaluate variable expressions. Perform operations following the proper order of operations. Explain how to solve linear equations and applications of varying forms and formulas. Simplify variable expressions using addition, multiplication and distributive properties.		
	Description	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Shop Algebra Overview 200 Lessons 1-19	ToolingU
	Define the term algebra and variables.	Web-Enhanced Lecture	Read/Review Shop Algebra Overview 200 Lessons 2-3	ToolingU
	Solve algebraic problems containing symbols using the proper order of operations.	Web-Enhanced Lecture	Read/Review Shop Algebra Overview 200 Lessons 4-7	ToolingU
Learning	Demonstrate factoring, distribution, and balancing in an algebra equation.	Web-Enhanced Lecture	Read/Review Shop Algebra Overview 200 Lessons 8-10	ToolingU
	Solve problems using addition, subtraction, multiplication, and division.	Web-Enhanced Lecture	Read/Review Shop Algebra Overview 200 Lessons 11-12	ToolingU
	Solve algebraic problems with constants and using common formulas.	Web-Enhanced Lecture	Read/Review Shop Algebra Overview 200 Lessons 13-19	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 35	**Lesson Plan for:**	Basic Trigonometry		
	Session Summary:	This session will introduce the basic concepts of trigonometry.		
	Objectives:	Explain the types and angles of a triangle. Introduce the use of the Pythagorean Theorem to find the lengths and angles of right triangles. Illustrate how to solve problems using sine, cosine, and tangent ratios for right triangles.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Shop Essentials - Shop Trig Overview 210 Lessons 1-13	ToolingU
	Describe the properties of triangles.	Web-Enhanced Lecture	Read/Review Shop Trig Overview 210 Lessons 2-4	ToolingU
	Solve simple trigonometry problems using by combining one's knowledge of shapes and trigonometry.	Web-Enhanced Lecture	Read/Review Shop Trig Overview 210 Lessons 5-6	ToolingU
	Define and solve problems using the Pythagorean Theorem.	Web-Enhanced Lecture	Read/Review Shop Trig Overview 210 Lessons 7-8	ToolingU
	Use trigonometry to address problems likely to be encountered in manufacturing.	Web-Enhanced Lecture	Read/Review Shop Trig Overview 210 Lessons 9-10	ToolingU
	Use sine, cosine, and tangent to describe and calculate the properties of triangles and circles.	Web-Enhanced Lecture	Read/Review Shop Trig Overview 210 Lessons 11-13	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 36	**Lesson Plan for:**	Kaizen		
	Session Summary:	This session will introduce the concepts of using Kaizen for process improvements.		
	Objectives:	Define Kaizen and its applications. Relate lean principles and Kaizen as a means to achieve lean production. Study the Kaizen methodology including the steps and tools necessary to implement. Perform a mock Kaizen event for product improvement.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Conducting Kaizen Events 260 Lessons 1-20	ToolingU
	Describe a kaizen event and list the benefits of kaizen events in achieving desired results.	Web-Enhanced Lecture	Read/Review Conducting Kaizen Events 260 Lessons 2-3	ToolingU
	Describe the the purpose of Kaizen and possible obstacles.	Web-Enhanced Lecture	Read/Review Conducting Kaizen Events 260 Lessons 4-5	ToolingU
	Identify key participants in a kaizen event and employee engagement.	Web-Enhanced Lecture	Read/Review Conducting Kaizen Events 260 Lessons 6-7	ToolingU
	Describe how to conduct a Kaizen event.	Web-Enhanced Lecture	Read/Review Conducting Kaizen Events 260 Lessons 8-12	ToolingU
	Describe the process that take place during a Kaizen event.	Web-Enhanced Lecture	Read/Review Conducting Kaizen Events 260 Lessons 13-16	ToolingU
	Describe effective ways to carry out a kaizen implementation plan.	Web-Enhanced Lecture	Read/Review Conducting Kaizen Events 260 Lessons 14-16	ToolingU
	Participate in example Kaizen events.	Web-Enhanced Lecture; Hands-on	Read/Review Conducting Kaizen Events 260 Lessons 17-20; conduct a kaizen event for improving a school function such as book buyback, registration, etc.	ToolingU
Evaluation	Instructor observations of participation in a Kaizen event			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 37	**Lesson Plan for:**	Pythagorean Theorem		
	Session Summary:	This session will introduce the Pythagorean Theorem and how it can be used in an industrial setting.		
	Objectives:	Review the Pythagorean Theorem. Practice using the Pythagorean Theorem to solve right triangles embedded in other shapes. Demonstrate how the Pythagorean Theorem can be used to solve problems involving arcs. Explain how to use the scientific calculator to solve problems involving powers, roots, and mathematic functions associated with the Pythagorean Theorem.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Trig: Pythagorean Theorem 205 Lessons 1-13	ToolingU
	Identify the Pythagorean theorem.	Web-Enhanced Lecture	Read/Review Trig: Pythagorean Theorem 205 Lessons 2-3	ToolingU
	Solve basic problems involving powers and roots using the Pythagorean theorem.	Web-Enhanced Lecture	Read/Review Trig: Pythagorean Theorem 205 Lesson 4	ToolingU
	Use the Pythagorean theorem to find the unknown lengths of a triangle.	Web-Enhanced Lecture	Read/Review Trig: Pythagorean Theorem 205 Lessons 5-6	ToolingU
	Use the Pythagorean theorem to solve various parts in a drawing.	Web-Enhanced Lecture	Read/Review Trig: Pythagorean Theorem 205 Lessons 7-10	ToolingU
	Practice solving problems using the Pythagorean Theorem.	Web-Enhanced Lecture	Read/Review Trig: Pythagorean Theorem 205 Lessons 11-13	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 38	**Lesson Plan for:**	Sine, Cosine, and Tangent		
	Session Summary:	This session further expands upon trigonometry concepts by focusing on the use of sine, cosine, and tangent and their inverse to find unknown lengths and angles of right triangles.		
	Objectives:	Review the phrase SOHCAHTOA. Practice solving for missing angles using trigonometry functions. Introduce the concepts of cosecant, secant, and cotangent. Contextualize various industrial uses for the trigonometry functions.		
	Description	***Delivery Method***	***Activity***	***Materials***
Learning	ToolingU Reading Assignment	Online learning	Shop Essentials - Trig: Sine, Cosine, and Tangent 215 Lessons 1-17	ToolingU
	List the three primary trig. Ratios.	Web-Enhanced Lecture	Read/Review Trig: Sine, Cosine, and Tangent 215 Lessons 2-4	ToolingU
	Explain the phrase SOHCAHTOA.	Web-Enhanced Lecture	Read/Review Trig: Sine, Cosine, and Tangent 215 Lesson 5	ToolingU
	Use the sine, cosine, and tangent ratio to solve for a missing dimension.	Web-Enhanced Lecture	Read/Review Trig: Sine, Cosine, and Tangent 215 Lessons 6-9	ToolingU
	Describe cosecant, secant, and cotangent.	Web-Enhanced Lecture	Read/Review Trig: Sine, Cosine, and Tangent 215 Lesson 10	ToolingU
	Describe examples and uses of the trigonometry functions such as determining tapers.	Web-Enhanced Lecture	Read/Review Trig: Sine, Cosine, and Tangent 215 Lessons 11-17	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 39	**Lesson Plan for:**	Sine Bar		
	Session Summary:	This session will explain how to use the sine bar function to measure angles and its relationship to trigonometry function for determining missing information.		
	Objectives:	Define the term sine bar and it application to industry. Demonstrate how to set up and calculate a sine bar angle between plates and cylinders. Practice using sine bar to determine angles.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Shop Essentials - Trig: Sine Bar Applications 225 Lessons 1-14	ToolingU
	Describe what the term sine bar is.	Web-Enhanced Lecture	Read/Review Trig: Sine Bar Applications 225 Lessons 2-3	ToolingU
	Describe common applications for a sine bar.	Web-Enhanced Lecture	Read/Review Trig: Sine Bar Applications 225 Lesson 4	ToolingU
	Explain how to set up a sine bar angle.	Web-Enhanced Lecture	Read/Review Trig: Sine Bar Applications 225 Lesson 5	ToolingU
	Explain how a gage pin helps you measure distances and edges on a part.	Web-Enhanced Lecture	Read/Review Trig: Sine Bar Applications 225 Lessons 6-8	ToolingU
	Find the information on a print drawing required to enable the user to find the unknown values.	Web-Enhanced Lecture	Read/Review Trig: Sine Bar Applications 225 Lesson 9	ToolingU
	Conduct a sine bar inspection.	Web-Enhanced Lecture	Read/Review Trig: Sine Bar Applications 225 Lessons 10-14	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 40	**Lesson Plan for:**	Internal Audits		
	Session Summary:	This session will outline the process for conducting internal audits.		
	Objectives:	Build an understanding of the role of internal audits on the continuous improvement process. Preview the role and responsibilities associated with internal audits. Outline the major steps involved in the internal audit process. Discuss the importance of recording observations and documenting the findings in a report. Explain the importance of audit finding and corrective action.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Conducting an Internal Audit 200 Lessons 1-19	ToolingU
	Define the purpose of an internal audit.	Web-Enhanced Lecture	Read/Review Conducting an Internal Audit 200 Lessons 2-3	ToolingU
	Explain the importance of quality records and documentation on the auditing process.	Web-Enhanced Lecture	Read/Review Conducting an Internal Audit 200 Lessons 4-5	ToolingU
	List the benefits a company can gain from the results of an internal audit.	Web-Enhanced Lecture	Read/Review Conducting an Internal Audit 200 Lessons 6-7, 9	ToolingU
	List the steps in the internal audit process.	Web-Enhanced Lecture	Read/Review Conducting an Internal Audit 200 Lesson 8	ToolingU
	Describe procedures for sampling and interviewing to ensure the integrity of an audit.	Web-Enhanced Lecture	Read/Review Conducting an Internal Audit 200 Lessons 10-15	ToolingU
	Explain why implementing audit recommendations is important.	Web-Enhanced Lecture	Read/Review Conducting an Internal Audit 200 Lessons 16-19	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 41	**Lesson Plan for:**	Basics of Troubleshooting		
	Session Summary:	This session will provide an introduction to basic process troubleshooting.		
	Objectives:	Explain the importance of systematic troubleshooting. Distinguish between normal variation and a true quality problem. Discuss the importance of historical data and documentation. Relate troubleshooting to preventative, predictive, and reactive maintenance.		
	Description	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Troubleshooting: Identifying Problems 180 Lessons 1-13	ToolingU
	Define ttroubleshooting	Web-Enhanced Lecture; Hands-on	Read/Review Troubleshooting: Identifying Problems 180 Lessons 2-3; have students complete one or more troubleshooting activates that address brainstorming, research, morals, or creative thinking.	http://education.cu-portland.edu/blog/teaching-strategies/5-problem-solving-activities-for-the-classroom/
Learning	Differentiate between a simple deviation and a true problem.	Web-Enhanced Lecture	Read/Review Troubleshooting: Identifying Problems 180 Lessons 4-5	ToolingU
	Describe the steps necessary to determine the presents of a problems.	Web-Enhanced Lecture	Read/Review Troubleshooting: Identifying Problems 180 Lessons 6-7	ToolingU
	Define how documentation and accurate recordkeeping and benefit the troubleshooting process.	Web-Enhanced Lecture	Read/Review Troubleshooting: Identifying Problems 180 Lessons 8-11	ToolingU
	Distinguish between reactive, preventative, and predictive maintenance.	Web-Enhanced Lecture	Read/Review Troubleshooting: Identifying Problems 180 Lesson 12	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 42	**Lesson Plan for:**	Cause and Effect of Problems		
	Session Summary:	This session introduces cause and effect relationships in troubleshooting.		
	Objectives:	Discuss the cause and effect relationship of problems and problem troubleshooting. Explain the basic troubleshoot strategy steps. Illustrate the importance of asking key questions and brainstorming in process troubleshooting. Discuss tools and techniques for quickly resolving process problems.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Troubleshooting: Understanding Causes & Effects 182 Lessons 1-13	ToolingU
	Define troubleshooting and the advantages of working backwards.	Web-Enhanced Lecture	Read/Review Troubleshooting: Understanding Causes & Effects 182 Lessons 2-3	ToolingU
	Describe the brainstorming process.	Web-Enhanced Lecture	Read/Review Troubleshooting: Understanding Causes & Effects 182 Lessons 4-5	ToolingU
	Use troubleshooting tools: check sheets, cause and effect diagrams, and fishbone diagrams.	Web-Enhanced Lecture	Read/Review Troubleshooting: Understanding Causes & Effects 182 Lessons 6-9	ToolingU
	Practice identifying causes and fixes for solving problems.	Web-Enhanced Lecture; Hands-on	Read/Review Troubleshooting: Understanding Causes & Effects 182 Lessons 10-13; have students troubleshoot a process or safety case and document their findings	www.toolingu.com example process failure or safety incident
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 43	**Lesson Plan for:**	Corrective Actions		
	Session Summary:	This session will discuss ways to resolve process problems identified through the troubleshooting process.		
	Objectives:	Discuss the advantages and disadvantages of using teams to troubleshoot production problems. Explain means to prioritize problems and corrective actions. Differentiate between permanent and temporary solutions. Communicate challenges and solutions for troubleshooting complex processes.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Troubleshooting: Taking Corrective Action 184 Lessons 1-12	ToolingU
	Describe the advantages of using teams in the troubleshooting process.	Web-Enhanced Lecture	Read/Review Troubleshooting: Taking Corrective Action 184 Lessons 2-3	ToolingU
	Evaluate data as a means to identify problems and corrective action.	Web-Enhanced Lecture	Read/Review Troubleshooting: Taking Corrective Action 184 Lessons 4-6	ToolingU
	Demonstrate how to prioritize solutions.	Web-Enhanced Lecture	Read/Review Troubleshooting: Taking Corrective Action 184 Lessons 7-8	ToolingU
	Describe means for minimizing repeating problems and the importance of documenting the recommendations.	Web-Enhanced Lecture	Read/Review Troubleshooting: Taking Corrective Action 184 Lesson 9	ToolingU
	Discuss challenges and advantages and the troubleshooting process.	Web-Enhanced Lecture	Read/Review Troubleshooting: Taking Corrective Action 184 Lessons 10-12	ToolingU
Evaluation	Instructor observations, assign homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 44	**Lesson Plan for:**	Six Sigma Goals and Tools		
	Session Summary:	This session will focus on the DMAIC process of Six Sigma.		
	Objectives:	Overview DMAIC and its relationship to lean six sigma. Discuss the five phases of the DMAIC process and the key objectives, tools, and methods use to achieve each phase. Explain the benefit and challenges of the DMAIC process.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Quality - Six Sigma Goals and Tools 310 Lessons 1-17	ToolingU
	Discuss the DMAIC process.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lesson 2	ToolingU
	Explain the goals of each stage of DMAIC.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lesson 3	ToolingU
	Discuss the "define" stage of DMAIC.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lessons 4-6	ToolingU
	Describe the "measure" stage of DMAIC.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lessons 7-9	ToolingU
	Describe the "analyze" stage of DMAIC.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lessons 10-12	ToolingU
	Describe the "improve" stage of DMAIC.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lessons 13-14	ToolingU
	Describe the "control" stage of DMAIC.	Web-Enhanced Lecture	Read/Review Six Sigma Goals and Tools 310 Lessons 15-17	ToolingU
Evaluation	Instructor assigned homework or quiz.			

Degree/Diploma:	**Diversified Manufacturing Technology**			
Course:	**Introduction to Quality and Continuous Improvement**			
Session 45	**Lesson Plan for:**	Measuring System Analysis		
	Session Summary:	This session explains statistical process control and measuring systems analysis as it related to conforming and non-conforming conditions.		
	Objectives:	Define the term Measurement System Analysis (MSA). Differentiate between MSA and SPC. Discuss the five parameters of in MSA: bias, linearity, stability, repeatability, and reproducibility. Introduce types of variation. Introduce the terminology and concept of gage repeatability and reproducibility.		
Learning	***Description***	***Delivery Method***	***Activity***	***Materials***
	ToolingU Reading Assignment	Online learning	Inspection - Measuring System Analysis 300 Lessons 1-20	ToolingU
	Define MSA and SPC	Web-Enhanced Lecture	Read/Review Measuring System Analysis 300 Lessons 2-5	ToolingU
	Describe measurement value uncertainty, measurement assurance, and types of measurement variation.	Web-Enhanced Lecture	Read/Review Measuring System Analysis 300 Lessons 6-9	ToolingU
	Discuss gage variation and calibration.	Web-Enhanced Lecture	Read/Review Measuring System Analysis 300 Lessons 10-12	ToolingU
	Discuss short and long-termcapability studies.	Web-Enhanced Lecture	Read/Review Measuring System Analysis 300 Lessons 13-15	ToolingU
	Prepare and analyze a non-conformance report.	Web-Enhanced Lecture; Hands-on	Read/Review Measuring System Analysis 300 Lessons 16-20; complete an non-conformance report for a given set of conditions.	www.toolingu.com non-conformance product example, non-conformance form
Evaluation	Evaluate the completion of a non-conformance report			