

ILLINOIS VALLEY COMMUNITY COLLEGE



COURSE OUTLINE

DIVISION: Workforce Development

COURSE: GNT 1225 – Quality & Measurement

Date: Spring 2015

Credit Hours: 2

Prerequisite(s): None

Delivery Method:

| | |
|---|---|
| <input checked="" type="checkbox"/> Lecture | 1 Contact Hours (1 contact = 1 credit hour) |
| <input type="checkbox"/> Seminar | 0 Contact Hours (1 contact = 1 credit hour) |
| <input checked="" type="checkbox"/> Lab | 2 Contact Hours (2 contact = 1 credit hour) |
| <input type="checkbox"/> Clinical | 0 Contact Hours (3 contact = 1 credit hour) |
| <input type="checkbox"/> Online | |
| <input type="checkbox"/> Blended | |

Offered: Fall Spring Summer

IAI Equivalent – **Only for Transfer Courses**—go to <http://www.itransfer.org>:

CATALOG DESCRIPTION:

This course provides an introduction to controlling and improving quality in a manufacturing setting. Explores ways that manufacturers use data and analysis to improve quality. Students will have the opportunity to earn the Quality and Measurement Certification through the Manufacturing Skill Standards Council (MSSC).

GENERAL EDUCATION GOALS ADDRESSED

[See the last page of this form for more information.]

Upon completion of the course, the student will be able:

[Choose those goals that apply to this course.]

- To apply analytical and problem solving skills to personal, social and professional issues and situations.
- To communicate orally and in writing, socially and interpersonally.
- To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
- To understand and use contemporary technology effectively and to understand its impact on the individual and society.
- To work and study effectively both individually and in collaboration with others.
- To understand what it means to act ethically and responsibly as an individual in one's career and as a member of society.
- To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
- To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals.]

Upon completion of the course, the student will be able to:

1. Read multi-view drawings to visualize part shapes, identify features, and identify dimensions
2. Read drawings to determine part hole sizes and locations, scales, title blocks, part section features, and fastener sizes
3. Interpret part dimension tolerances, geometric dimensioning and tolerancing (GD&T) symbols and frames, and datums
4. Interpret English and S.I. measurements; perform system conversion; use tape measures and rules; accuracy and repeatability
5. Demonstrate making precision measurements using dial calipers, digital calipers, and micrometers
6. Demonstrate gauging parts using dial indicators, digital indicators, and data acquisition software; calibration of instruments; part mastering
7. Identify quality system elements, define quality, identify ISO 9000 standard, list types of quality management systems, explain the PDCA cycle, describe continuous improvement concepts, audits, and inspections
8. Explain methods of process improvement, the importance of data collection and analysis, and identify types of statistical tools
9. Explain the concepts of statistical process control, calculate mean, range, construct and analyze histograms, determine and interpret Cpk
10. Identify types and applications of control charts; construct and analyze an X bar and R chart
11. Identify applications of root cause failure analysis; construct and analyze Pareto charts; use brainstorming and fishbone diagrams to solve production problems, apply corrective and preventive action
12. Describe the role of managers and production workers in quality and quality teams
13. Describe the methods of quality inspection at different stages of manufacturing document and communicate inspection results

14. Identify types of quality audits, quality audit procedures, and document quality audit results; develop an action plan and recommendation from a quality audit
15. Identify types of nonconformities and methods of detection; perform a root cause failure analysis; decide when / how to take preventative and corrective action
16. Perform an effectiveness check; document and report preventative and corrective actions

COURSE TOPICS AND CONTENT REQUIREMENTS:

- I. Blueprint Reading 1 (Multi-view Drawings)
- II. Blueprint Reading 2 (Assembly Drawings and Fasteners)
- III. Blueprint Reading 3 (GD&T)
- IV. Basic Measurement
- V. Precision Measurement Tools
- VI. Dimensional Gauging
- VII. Quality Systems
- VIII. Quality Improvement
- IX. Introduction to SPC
- X. Control Charts
- XI. Continuous Improvement-1
- XII. Continuous Improvement-2
- XIII. Quality Inspections
- XIV. Quality Audits
- XV. Preventative and Corrective Actions
- XVI. Verification and Documentation

INSTRUCTIONAL METHODS:

1. Lecture
2. Demonstration
3. Problem solving and discussion
4. Hands-on Exercises
5. MSSC online e-Learning modules

INSTRUCTIONAL MATERIALS:

Warren Hammer, *Blueprint Reading Basics*, 3rd ed., Industrial Press, 2001. ISBN: 978-0831-131258.

Manufacturing Skill Standards Council, *High-Performance Manufacturing*, Woodland Hills, CA, 2006

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

1. Tests and quizzes
2. Student presentations

OTHER REFERENCES

Course Competency/Assessment Methods Matrix

| Course Prefix, Number and Name | Assessment Options | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------------------|----------------|--------------|----------------|----------|--------------------|----------------|---------|---------------|------------------------------------|-------------------|---------------------------------|---------------------------|----------------------|-------------|-----------------|----------------------|---------------------|---------------------|-----------------------------------|----------------------|-------------------------------|---------------------------|------------------|------------------|--|----------------|-------------------|------------|-----------|----------------|------------|--|--|
| For each competency/outcome place an "X" below the method of assessment to be used. | Assessment of Student Learning | Article Review | Case Studies | Group Projects | Lab Work | Oral Presentations | Pre-Post Tests | Quizzes | Written Exams | Artifact Self Reflection of Growth | Capstone Projects | Comprehensive Written Exit Exam | Course Embedded Questions | Multi-Media Projects | Observation | Writing Samples | Portfolio Evaluation | Real World Projects | Reflective Journals | Applied Application (skills) Test | Oral Exit Interviews | Accreditation Reviews/Reports | Advisory Council Feedback | Employer Surveys | Graduate Surveys | Internship/Practicum /Site Supervisor Evaluation | Licensing Exam | In Class Feedback | Simulation | Interview | Written Report | Assignment | | |
| | Direct/ Indirect | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | I | I | I | I | D | D | | | | | | | | |
| Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below. | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 1. Read multi-view drawings to visualize part shapes, identify features, and identify dimensions | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 2. Read drawings to determine part hole sizes and locations, scales, title blocks, part section features, and fastener sizes | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 3. Interpret part dimension tolerances, geometric dimensioning and tolerancing (GD&T) symbols and frames, and datums | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 4. Interpret English and S.I. measurements; perform system conversion; use tape measures and rules; accuracy and repeatability | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 5. Demonstrate making precision measurements using dial calipers, digital calipers, and micrometers | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 6. Demonstrate gauging parts using dial indicators, digital indicators, and data acquisition software; calibration of instruments; part mastering | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |
| 7. Identify quality system elements, define quality, identify ISO 9000 standard, list types of quality management systems, explain the PDCA | | | | X | X | X | X | | | | | X | X | | | | | | | | | X | X | X | X | | X | X | | | | | | |

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| cycle, describe continuous improvement concepts, audits, and inspections | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. Explain methods of process improvement, the importance of data collection and analysis, and identify types of statistical tools | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 9. Explain the concepts of statistical process control, calculate mean, range, construct and analyze histograms, determine and interpret Cpk | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 10. Identify types and applications of control charts; construct and analyze an X bar and R chart | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 11. Identify applications of root cause failure analysis; construct and analyze Pareto charts; use brainstorming and fishbone diagrams to solve production problems, apply corrective and preventive action | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 12. Describe the role of managers and production workers in quality and quality teams | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 13. Describe the methods of quality inspection at different stages of manufacturing document and communicate inspection results | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 14. Identify types of quality audits, quality audit procedures, and document quality audit results; develop an action plan and recommendation from a quality audit | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 15. Identify types of nonconformities and methods of detection; perform a root cause failure analysis; decide when / how to take preventative and corrective action | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |
| 16. Perform an effectiveness check; document and report preventative and corrective actions | | | | X | X | X | X | | | X | X | | | | | | X | X | X | X | | | X | X | | | | | | |