**ENGT 160 – Metrology and Quality Control**

**Master Syllabus**

**Course:** ENGT 160 – Metrology and Quality Control **Course Credits:** 2-2-3

**Course Prerequisite:** Eligibility for Math 104 **ICCB Code: PCS # 1.2150702**

**Mode of Delivery**: Traditional or hybrid **IAI #:** N/A

**Instructor:** John Daum **Dev/Rev Date:** 04/17/13

**Phone: 217-875-7211**

**Email: jdaum@richland.edu**

**Projected Date of Initial Offering:** Fall 2013

**Course Description:**

ENGT 160 - Metrology and Quality Control provides a hands-on introduction to precision measurement and quality control. Topics include an introductory overview of Total Quality Management, Statistical Process Control, Six Sigma, blue print specifications, and measurement math. Measuring instruments focus on machining inspection and include micrometer and vernier tools, dial indication instruments, hole inspection, production gaging, gauge blocks, and layout tools. Advanced technologies are introduced including coordinate measuring machine (CMM) and vision inspection system. Measurement data is analyzed with basic statistical methods including control charts, and sampling plans. Data is analyzed to determine correction plans.

This course was modified to meet the requirements of the Manufacturing Skills Standards Council (MSSC) and prepares the student for the Module 2: Quality Practices & Measurement Exam for the Certified Production Technician (CPT) certification.

 Applicable toward graduation where program structure permits:

* Certificate or Degree – All Certificates, AAS, ALS
* Group Requirement - Not Applicable
* Area of Concentration – Not Applicable

**Text(s):**

* The Quality Technician’s Handbook Author: Griffith ISBN 0-13-041679-7

 Publisher: Prentice Hall Date: 2003

* High-Performance Manufacturing, by MSSC, Glencoe/MacGraw-Hill., 2006

 ISBN 0-07-861487-2

**Lab handouts and materials to be furnished by instructor.**

**Course Objectives/Outcomes:** The student will obtain the following skills and attitudes by completion of this course:

|  |  |
| --- | --- |
| **Course Outcomes:** | **RCC Cross-Disciplinary Outcomes:** |
| Participate in periodic or statistically based internal quality audit activities | 3 |
| Check and document calibration of gauges and other data collection equipment | 4 |
| Suggest continuous improvements | 2 |
| Inspect materials and product/process at all stages to ensure they meet specifications | 4 |
| Document the results of quality tests | 1 |
| Communicate quality problems | 1 |
| Take corrective actions to restore or maintain quality | 4 |
| Record process outcomes and trends | 1 |
| Identify fundamentals of blueprint reading | 3 |
| Use common measurement systems and precision measurement tools | 3 |
| Describe advanced technology inspection methods | 1 |
| Prepared to take the MSSC Module 2: Quality Practices & Measurement Exam for the Certified Production Technician (CPT) certification. | 1, 2, 3 |

**Cross-Disciplinary Outcomes**

1. *The degree-seeking student will be able to communicate effectively (read, write, speak and listen).*
2. *The degree-seeking student will think critically and creatively.*
3. *The degree-seeking student will manage technology and evaluate information in various research and applied contexts.*
4. *The degree-seeking student will act professionally and responsibly.*

**Topical Outline:**

|  |  |  |
| --- | --- | --- |
| WEEK | CONTENT | LABS |
| Week 1 | Total Quality Management Overview |  |
| Week 2 | Part Specification and Print Reading | Lab #1 |
| Week 3 | Measurement Math | Lab #2 |
| Week 4 | Statistical Process Control | Lab #3 |
| Week 5 | Micrometer Measurement Tools | Lab #4 |
| Week 6 | Dial Caliper Functionality | Lab #5 |
| Week 7 | Vernier Measurement Tools | Lab #6 |
| Week 8 | Depth Measurement Tools (Midterm) | Lab #7 |
| Week 9 | Gauge Measurement Tools | Lab #8 |
| Week 10 | Surface Finish Inspection | Lab #9 |
| Week 11 | Inspection Surface Plate setups | Lab #10 |
| Week 12 | Geometric Tolerancing | Lab #11 |
| Week 13 | Layouts | Lab #12 |
| Week 14 | Charting and data analysis | Lab #13 |
| Week 15 | CMM and Vision Inspection Systems | Lab #14 |
| Week 16 | Plant Tour |  |
| Week 17 | FINALS |  |

**Methods of Evaluation:**

**Grading:** Labs and projects 30% A = 90 - 100

 Tests and quizzes 30% B = 80 - 89

 Final 20% C = 70 – 79

 Presentations and reports 10% F = 69 or below

 Class participation and teamwork 10%

**Additional Course Information:** The following tools are required:

Calculator

USB flash drive

Safety Glasses

This workforce solution was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timelines, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use, by an organization and/or personal use by an individual for  non-commercial purposes, is permissible. All other uses require the prior authorization of the copyright holder.