***ILLINOIS VALLEY COMMUNITY COLLEGE***



## COURSE OUTLINE

**DIVISION:**

**COURSE: GNT 1235; Introduction to Manufacturing Maintenance**

Date: Spring 2013

Instructor: Jennifer Scheri

Phone: 815-224-0390

Email: Jennifer\_Scheri@ivcc.edu

Credit Hours:  2

Prerequisite(s): None

Delivery Method: [x]  **Lecture** **1 Contact Hours (1 contact = 1 credit hour)**

[ ]  **Seminar Contact Hours (1 contact = 1 credit hour)**

[x]  **Lab 2 Contact Hours (2 contact = 1 credit hour)**

[ ]  **Clinical Contact Hours (3 contact = 1 credit hour)**

**[ ]  Online**

**[ ]  Blended**

Offered: [x]  **Fall** **[x]  Spring** **[x]  Summer**

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

**CATALOG DESCRIPTION:**

This course provides a basic understanding of tools and equipment used in manufacturing and knowledge of how to improve productivity through predictive and preventive maintenance. Students will have the opportunity to earn the Manufacturing Maintenance 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. Identify the types of welding, applications, operation of the welding process, and welding safety
2. Describe the operation of basic electrical circuits, input devices, and output devices; basic concept of AC and DC electricity; read and interpret an electrical schematic
3. Explain the basic concepts of electrical resistance, voltage, current, series circuits, and parallel circuits; demonstrate the use of multimeter to measure electrical signals
4. Explain the basic concepts of power consumption in series and parallel electrical circuit; select and size circuit protection devices; reset circuit protection devices, operation of motor starters and overload protection; basic AC motor operation; operate a motor control circuit
5. Describe the basic concepts of pneumatic system operation with linear actuators; adjust and read pressure; connect an air hose; operate pneumatic circuit; drain a filter, read and interpret a pneumatic schematic
6. Explain the basic concepts of hydraulic power system operation with component identification, power unit operation, circuit connections, and basic cylinder circuits
7. Describe the types, properties, and applications of grease and oil for lubrication; use of viscosimeter; use of grease gun; lubrication management, recycling
8. Describe the types, operation, and application of bearings and couplings; mechanical power transmission safety guidelines; importance of proper shaft alignment. Additionally, gear drives components and calculations are covered
9. Describe the types, operation, and application of belt drives; calculate speed and torque ratios; align a belt drive and adjust tension
10. Describe the types, operation, and application of chain drives; calculate speed and torque ratios align a belt drive and adjust tension
11. Explain the basic concepts of electrical relay logic; solenoid valve operation; connect a basic electrical logic circuit; interpret a basic ladder diagram schematic
12. Explain the basic concepts of electrical relay control; limit switch and sensor operation; connect a basic cylinder reciprocation relay circuit, operation of automatic/manual machine modes; connects a basic timer

**COURSE TOPICS AND CONTENT REQUIREMENTS~~:~~**

1. Welding
2. Basic Electrical Circuits
3. Electrical Measurement
4. Electrical Power
5. Pneumatic Power Systems
6. Hydraulic Power Systems
7. Lubrication Concepts
8. Bearings and Couplings
9. Belt Drives
10. Chain Drives
11. Machine Control Concepts
12. Machine Automation

**INSTRUCTIONAL METHODS:**

1. Lecture

2. Demonstration

3. Problem solving and discussion

4. MSSC online e-Learning modules

**INSTRUCTIONAL MATERIALS:**

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

Sample technical manuals.

**STUDENT REQUIREMENTS AND METHODS OF EVALUATION:**

1. Tests and quizzes

2. Student presentations

**OTHER REFERENCES**

“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.”

Course Competency/Assessment Methods Matrix

| **GNT 1235; Introduction to Manufacturing Maintenance** | **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 |
| Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below. | **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 |  |  |  |  |  |  |
| 1. Identify the types of welding, applications, operation of the welding process, and welding safety |  |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 2. Describe the operation of basic electrical circuits, input devices, and output devices; basic concept of AC and DC electricity; read and interpret an electrical schematic |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 3. Explain the basic concepts of electrical resistance, voltage, current, series circuits, and parallel circuits; demonstrate the use of multimeter to measure electrical signals  |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 4. Explain the basic concepts of power consumption in series and parallel electrical circuit; select and size circuit protection devices; reset circuit protection devices, operation of motor starters and overload protection; basic AC motor operation; operate a motor control circuit |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 5. Describe the basic concepts of pneumatic system operation with linear actuators; adjust and read pressure; connect an air hose; operate pneumatic circuit; drain a filter, read and interpret a pneumatic schematic |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 6. Explain the basic concepts of hydraulic power system operation with component identification, power unit operation, circuit connections, and basic cylinder circuits |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 7. Describe the types, properties, and applications of grease and oil for lubrication; use of viscosimeter; use of grease gun; lubrication management, recycling |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 8. Describe the types, operation, and application of bearings and couplings; mechanical power transmission safety guidelines; importance of proper shaft alignment. Additionally, gear drives components and calculations are covered |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 9. Describe the types, operation, and application of belt drives; calculate speed and torque ratios; align a belt drive and adjust tension |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 10. Describe the types, operation, and application of chain drives; calculate speed and torque ratios align a belt drive and adjust tension |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 11. Explain the basic concepts of electrical relay logic; solenoid valve operation; connect a basic electrical logic circuit; interpret a basic ladder diagram schematic |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 12. Explain the basic concepts of electrical relay control; limit switch and sensor operation; connect a basic cylinder reciprocation relay circuit, operation of automatic/manual machine modes; connects a basic timer |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 13. Identify the types of welding, applications, operation of the welding process, and welding safety |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 14. Describe the operation of basic electrical circuits, input devices, and output devices; basic concept of AC and DC electricity; read and interpret an electrical schematic |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 15. Explain the basic concepts of electrical resistance, voltage, current, series circuits, and parallel circuits; demonstrate the use of multimeter to measure electrical signals  |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |
| 16. Explain the basic concepts of power consumption in series and parallel electrical circuit; select and size circuit protection devices; reset circuit protection devices, operation of motor starters and overload protection; basic AC motor operation; operate a motor control circuit |  |  |  | X |  | X | X | X |  |  |  | X |  | X |  |  |  |  |  |  | X | X | X | X |  | X | X |  |  |  |  |