

ILLINOIS VALLEY COMMUNITY COLLEGE



COURSE OUTLINE

DIVISION: Workforce Development

COURSE: GNT 1235 – Introduction to Manufacturing Maintenance

Date: Spring 2015

Credit Hours: 2

Prerequisite(s): None

Delivery Method: **Lecture** **1 Contact Hours** (1 contact = 1 credit hour)
 Seminar **0 Contact Hours** (1 contact = 1 credit hour)
 Lab **2 Contact Hours** (2 contact = 1 credit hour)
 Clinical **0 Contact Hours** (3 contact = 1 credit hour)
 Online
 Blended

Offered: **Fall** **Spring** **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:

- I. Welding
- II. Basic Electrical Circuits
- III. Electrical Measurement
- IV. Electrical Power
- V. Pneumatic Power Systems
- VI. Hydraulic Power Systems
- VII. Lubrication Concepts
- VIII. Bearings and Couplings
- IX. Belt Drives
- X. Chain Drives
- XI. Machine Control Concepts
- XII. 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:

INSTRUCTIONAL METHODS:

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

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							
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						
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						
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						
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						
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						
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						
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						
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						
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						
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						
16. Explain the basic concepts of power consumption in series and parallel electrical circuit; select and size circuit protection				X	X	X	X			X	X								X	X	X	X						

devices; reset circuit protection devices, operation of motor starters and overload protection; basic AC motor operation; operate a motor control circuit																			
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