

# ILLINOIS VALLEY COMMUNITY COLLEGE



## COURSE OUTLINE

DIVISION: Workforce Development

COURSE: GNT 1230 – Manufacturing Processes

Date: Spring 2015

Credit Hours: 3

Prerequisite(s): None

Delivery Method:

<input checked="" type="checkbox"/> Lecture	2 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 introduces the basics of how manufacturing transforms materials into products. Students will learn about the varying types of production and will learn about the materials that are used in production and the types of processes used in manufacturing including machining, casting and assembly. Students will have the opportunity to earn the Manufacturing Process and Production 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. Interpret specifications, work orders, and technical drawings
2. Identify the major stages of production, production resources, and factors for production method selection
3. Identify the characteristics and advantages of major types of production systems
4. Six (6) types of simple machines, operation and applications of levers, and concepts of force and weight
5. Describe the effect of friction on machine operation; operation of machine linkages, cams, and turnbuckles
6. Identify types, properties, and applications of materials and chemicals used to manufacture products, including food and beverage products
7. Identify factors used to select materials for a given product, methods of testing material quality, and advances in material design
8. Describe types, operation and application of casting, molding, machining, finishing, assembly, separation, conditioning, combining, and filling
9. Interpret stock material sizes and types from specifications; use a band saw to cut stock material to size; types of machine tools
10. Use basic layout techniques to prepare a part for machining, size a drill bit, identify drill by size, select and install drill press tooling, operate a drill press
11. Use a drill press to perform basic drilling operations: reaming, counterboring, countersinking, and tapping
12. Identify types, applications and use of hand tools, portable power tools, and equipment
13. Interpret standard operating procedures; read technical manuals to obtain information; Total Productive Maintenance; machine operation procedures
14. Describe basic concepts of production planning, work flow, and facilities layout; identify bottlenecks and ways to balance workflow, Lean manufacturing concepts, product cost estimating
15. Describe types of inventory and inventory management concepts; read a bill of material; identify cost of downtime and calculate product cost

16. Describe the operation of push and pull production systems, just-in-time production, methods of feedback to control quality
17. Identify the types of production documents, methods of retaining documents, and use of electronic data exchange; read and handle production documents
18. Identify the types and applications of product packaging; packaging regulations and laws; select packaging for given product; interpret package labels
19. Describe methods and applications of transporting produced products; interpret shipping documents; use a tracking system

### **COURSE TOPICS AND CONTENT REQUIREMENTS:**

- I. Customer Contact
- II. Creating Products
- III. Types of Production
- IV. Mechanical Principles
- V. Mechanical Linkages
- VI. Production Materials
- VII. Testing, Selecting, and Developing Materials
- VIII. Production Processes
- IX. Machining Processes
- X. Machine Tooling
- XI. Machine Operations
- XII. Tools and Equipment Use
- XIII. Equipment Procedures
- XIV. Production Planning and Workflow
- XV. Production Components
- XVI. Production Control
- XVII. Documenting the Process
- XVIII. Product Packaging
- XIX. Product

Distribution

### **INSTRUCTIONAL METHODS:**

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

### **INSTRUCTIONAL MATERIALS:**

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							
1. Interpret specifications, work orders, and technical drawings				X		X	X	X				X		X								X	X	X	X		X	X					
2. Identify the major stages of production, production resources, and factors for production method selection				X		X	X	X				X		X								X	X	X	X		X	X					
3. Identify the characteristics and advantages of major types of production systems				X		X	X	X				X		X								X	X	X	X		X	X					
4. Six (6) types of simple machines, operation and applications of levers, and concepts of force and weight				X		X	X	X				X		X								X	X	X	X		X	X					
5. Describe the effect of friction on machine operation; operation of machine linkages, cams, and turnbuckles				X		X	X	X				X		X								X	X	X	X		X	X					
6. Identify types, properties, and applications of materials and chemicals used to manufacture products, including food and beverage products				X		X	X	X				X		X								X	X	X	X		X	X					
7. Identify factors used to select materials for a given product, methods of testing material quality, and advances in material design				X		X	X	X				X		X								X	X	X	X		X	X					
8. Describe types, operation and application of casting, molding, machining, finishing, assembly, separation, conditioning, combining,				X		X	X	X				X		X								X	X	X	X		X	X					

and filling																																							
9. Interpret stock material sizes and types from specifications; use a band saw to cut stock material to size; types of machine tools				X	X	X	X			X	X								X	X	X	X			X	X													
10. Use basic layout techniques to prepare a part for machining, size a drill bit, identify drill by size, select and install drill press tooling, operate a drill press				X	X	X	X			X	X								X	X	X	X			X	X													
11. Use a drill press to perform basic drilling operations: reaming, counterboring, countersinking, and tapping				X	X	X	X			X	X								X	X	X	X			X	X													
12. Identify types, applications and use of hand tools, portable power tools, and equipment				X	X	X	X			X	X								X	X	X	X			X	X													
13. Interpret standard operating procedures; read technical manuals to obtain information; Total Productive Maintenance; machine operation procedures				X	X	X	X			X	X								X	X	X	X			X	X													
14. Describe basic concepts of production planning, work flow, and facilities layout; identify bottlenecks and ways to balance workflow, Lean manufacturing concepts, product cost estimating				X	X	X	X			X	X								X	X	X	X			X	X													
15. Describe types of inventory and inventory management concepts; read a bill of material; identify cost of downtime and calculate product cost				X	X	X	X			X	X								X	X	X	X			X	X													
16. Describe the operation of push and pull production systems, just-in-time production, methods of feedback to control quality				X	X	X	X			X	X								X	X	X	X			X	X													
17. Identify the types of production documents, methods of retaining documents, and use of electronic data exchange; read and handle production documents				X	X	X	X			X	X								X	X	X	X			X	X													
18. Identify the types and applications of product packaging; packaging regulations and laws; select packaging for given product; interpret package labels				X	X	X	X			X	X								X	X	X	X			X	X													
19. Describe methods and applications of transporting produced products; interpret shipping documents; use a tracking system				X	X	X	X			X	X								X	X	X	X			X	X													