CREDIT COURSE OUTLINE

I. COVER PAGE

(1) MFGT 22	(2) Industrial Materials	(3) 2
Number	Title	Units

(4)	Lecture / Lab Hours:			(8)Classification:			
	Course Hours						
		Weekly Lec hours:	2.00			Degree applicable:	X
		Weekly Lab hours:	0.50			Non-degree applicable:	
		Total Contact hours:	45.00			Basic skills:	
	Lec will generate __ hour(s) outside work.			(9)RC	Fulfills AS/AA degree requirement: (area)		
	Lab will generate __ hour(s) outside work.				General education category:		
(5)	Grading Basis:	Grading Scale Only			Major:		
		Pass/No Pass option	X		Certificate of:		
		Pass/No Pass only			Certificate in:		
(6)	Advisories: • Eligibility for Engl 126 Eligibility for Math 101			(10)CSU	Baccalaureate:		X
(7)	Pre-requisites (requires C grade or better): • Industrial Technology 205 Eligibility for English 252, 262 and Mathematics 256			(11)Repeatable: (A course may be repeated three times)			0
	Corequisites: •			(12)C-ID:			
				Proposed Start Date:			Fall 2012

(12) Catalog Description:
Selection / identification of steels, non-ferrous metals and other industrial materials. Heat treatment processes, hardness testing, working characteristics of materials and workplace applications for each, Adhesives/fillers, Material shearing / forming

II. COURSE OUTCOMES:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

I. Integrate selection / identification of materials into a work environment.
II. Practice safe shop techniques in operating and servicing industrial working machinery.
III. Recommend appropriate processes to treat and test industrial materials.

III. COURSE OBJECTIVES:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

I. Select proper materials for specific manufacturing operations.
II. Apply material working principles to correct manufacturing problems.
III. Compute mathematical formulas and understand basic principles that apply to industrial materials.
IV. Practice proper maintenance and operation of industrial working machinery.
V. Learn safety precautions as needed for manufacturing trades.

IV. COURSE OUTLINE:

Lecture Content:

A. Technology and Careers - career opportunities in high tech fields
1. Engineer
2. Machinist technician
3. Welder
4. Maintenance worker

B. Metals – various types and how they are used in industry
1. Steels
2. Non-ferrous metals
3. High temperature metals
4. Exotic space age metal alloys

C. Shop Safety – safety practices and procedures
1. General safety
2. Hand tool safety
3. Machine tool safety
4. Fire safety
5. Chemical safety
6. Electrical safety

D. Hand Tools and Cutting Tools – various types of tools and their proper uses
1. Tools that strike
2. Tools that are struck
3. Cutting tools
4. Measuring tools and measurement

E. Forging and Heat Treating
1. Forge / furnace
2. Work holding tools
3. Metal hardening and tempering colors

F. Hardness testing
1. Equipment
2. Techniques

G. Shearing/ forming
1. Equipment
2. Techniques

H. Adhesives
1. Types
2. Applications
3. Repair procedures

I. Metal Finishes
1. Plating
2. Anodizing
3. Machining
4. Polishing

Lab Content:

A. Material identification
1. Ferrous
2. Non-ferrous
3. Stainless
4. Plastics
5. Adhesives

B. Use of hand tools for finishing
1. Files
2. Hand cutters
3. Abrasives
4. Fit up

B. Industrial problems
1. Trouble shooting problems
2. Selecting correct process to repair problem
3. Staging repair processes to correct a problem

C. Heat treating
1. Techniques
2. Steel oxidation colors

V. APPROPRIATE READINGS

Reading assignments may include but are not limited to the following:

I. Sample Text Title:
1. Recommended - Hoffman, P.,J *Modern Metalworking Workbook,* Delmar Cengage Learning, 2012,
2. Recommended - Oberg, E *Machinery's Handbook ,* ed. 29 Industrial Press , 2012,

II. Other Readings

___ Global or international materials or concepts are appropriately included in this course
___ Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing Check either 1 or 2 below			
	1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.		
X	***2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.***		
	a) essay exam(s)		d) written homework
	b) term or other paper(s)		e) reading reports
	c) laboratory report(s)		f) other (specify)

Required assignments may include but are not limited to the following:

B. Problem Solving Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)		d) laboratory reports
X	b) quizzes		e) field work
X	c) homework problems		f) other (specify):

Required assignments may include but are not limited to the following:
Sample question:
Select proper materials for prescribed project.

C. Skill demonstrations, including:			
X	a) class performance(s)	X	c) performance exams(s)
	b) field work		d) other (specify)

Required assignments may include but are not limited to the following:
1. Periodic lab assignments assess understanding of metal working principles.

2. Class performance is measured daily for participation, and overall quality of working environment

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false		e) other (specify):
X	c) matching items		

COURSE GRADE DETERMINATION:
Description/explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.
Problem Solving 20 - 40% Skill Demonstration 40 - 60% Objective Examination 20 - 40%

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met YES	NO
Textbook	X	
Reference materials	X	
Instructor-prepared materials	X	
Audio-visual materials	X	

Indicate Method of evaluation:
Used readability formulae (grade level 10 or higher) _____

Text is used in a college-level course X
Used grading provided by publisher
Other: (please explain; relate to Skills Levels)

Computation Level (Eligible for MATH 101 level or higher where applicable) X

Content

Breadth of ideas covered clearly meets college-level learning objectives of this course X

Presentation of content and/or exercises/projects:

Requires a variety of problem-solving strategies including inductive and deductive reasoning. X

Requires independent thought and study X

Applies transferring knowledge and skills appropriately and efficiently to new situations or problems. X

List of Reading/Educational Materials

Recommended - Hoffman, P.,J *Modern Metalworking Workbook,* Delmar Cengage Learning, 2012,

Recommended - Oberg, E *Machinery's Handbook ,* ed. 29 Industrial Press , 2012,

Modern Metalworking, Publisher Goodheart-Willcox 2004 Modern Metalworking Workbook, Publisher Goodheart-Willcox 2004 Machinery's Handbook 28th ed, Industrial Press ©2008

Comments:

X This course requires special or additional library materials (list attached).
Modern Metalworking, Publisher Goodheart-Willcox 2004 Modern Metalworking Workbook, Publisher Goodheart-Willcox 2004 Machinery's Handbook 28th ed, Industrial Press ©2008

X This course requires special facilities:
Manufacturing Shop

Attached Files:

Manufacturing Pathway

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BASIC SKILLS ADVISORIES PAGE The skills listed are those needed for eligibility for English 125, 126, and Math 201. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least three major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.

Eligibility for ENGL 126
(as outcomes for ENGL 262)

__X__ apply a variety of vocabulary skills for increased comprehension during reading.

__X__ apply prereading and active reading strategies to increase success with and comprehension of unfamiliar texts.

__X__ analyze expository texts to determine explicit/implicit main ideas and logical support, leading to author's intended meaning.

_____ determine basic organizational writing pattens to increase comprehension of expository texts.

_____ distinguish between fact and opinion and determine author's tone and purpose in non-fiction writings.

__X__ Select proper materials for specific manufacturing operations.

__X__ Apply material working principles to correct manufacturing problems.

_____ Compute mathematical formulas and understand basic principles that apply to industrial materials.

_____ Practice proper maintenance and operation of industrial working machinery.

_____ Learn safety precautions as needed for manufacturing trades.

Check the appropriate spaces.

_____ Eligibility for Math 201 is advisory for the target course.

__X__ Eligibility for English 126 is advisory for the target course.

_____ Eligibility for English 125 is advisory for the target course.

If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

REQUISITES

Prerequisite -- ENGL 262 READING IMPROVEMENT

• apply a variety of vocabulary skills for increased comprehension during reading. • apply prereading and active reading strategies to increase success with and comprehension of unfamiliar texts. • analyze expository texts to determine explicit/implicit main ideas and logical support, leading to author's intended meaning.	• Select proper materials for specific manufacturing operations. • Apply material working principles to correct manufacturing problems. • Compute mathematical formulas and understand basic principles that apply to industrial materials.

ESTABLISHING PREREQUISITES OR COREQUISITES

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

_____Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course.
Justification: Indicate how this is so.
_____The health or safety of the students in this course requires the prerequisite.
Justification: Indicate how this is so.
__X__The prerequisite course is part of a sequence of courses within or across a discipline.
_____The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.
Justification: Indicate how this is so.
_____The prerequisite/corequisite is required by law or government regulations.
Explain or cite regulation numbers:
_____The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
Justification: Indicate how this is so.
_____The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
Justification: Indicate how this is so.
_____Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:

Justification:

Prerequisite -- MATH 250 COLLEGE ARITHMETIC

• Apply the four arithmetic operations to fractions. • Apply the four arithmetic operations to integers. • Apply the four arithmetic operations to decimals.	• Select proper materials for specific manufacturing operations. • Apply material working principles to correct manufacturing problems. • Compute mathematical formulas and understand basic principles that apply to industrial materials.

ESTABLISHING PREREQUISITES OR COREQUISITES

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

_____Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course.
Justification: Indicate how this is so.
_____The health or safety of the students in this course requires the prerequisite.
Justification: Indicate how this is so.
__X__The prerequisite course is part of a sequence of courses within or across a discipline.
_____The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.
Justification: Indicate how this is so.
_____The prerequisite/corequisite is required by law or government regulations.
Explain or cite regulation numbers:
_____The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
Justification: Indicate how this is so.
_____The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
Justification: Indicate how this is so.
_____Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:

Justification:

JUSTIFICATION OF LIMITATION ON ENROLLMENT

Enrollment in courses or blocks of courses may be limited based on performance, honors, or other performance based criteria. Be mindful of the disproportionate impact the limitation will have on specific groups of students. It is important to determine if the limitation will disproportionately keep under-represented students from enrolling in the course or block of courses.

Describe the reasons for limiting the enrollment.

Course Designator: MFGT 22
Course Title(s): Industrial Materials
Rationale for Limiting Enrollment: 0