OBR	
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Ohio Articulation Number (OAN)
Course Submission Form
2005-2006

College/University Edison Community College

Course(s) Submitted(Title & Course #) MFG-120S, Materials Technology for
Ohio Articulation Number OET 013

Date 1 August 2006 Course 1 of a 1 Course OAN mapping.

Name and title of individual submitting on behalf of the college/university

Name Amanda Swigert Title Administrative Assistant to Vice President

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Credit Hours 3 qtr _____ sem X
Lecture Hours 3
Laboratory Hours 0 (if applicable)
Pre-Requisites(s) Course work (if applicable)

Placement Score (if applicable)
(Name of test)
(Domain) (Score)

Catalog/Course Description (Includes Course Title and Course #)

The properties of engineering materials. Mechanical and physical properties, testing, and heat treatment of metals are covered. Structures and properties of polymers, ceramics, and composite materials are also covered. Basic principles of chemistry are introduced as required for understanding.

Texts/Outside Readings/Ancillary Materials

Practical Metallurgy and Materials of Industry, 5th Edition, by John E. Neely, Prentice Hall Publishers.

Course Objectives and/or Plan of Work

COURSE GOALS:

The student will:

1. Identify the major categories of engineering materials and their applications.
2. Describe the basic mechanical and physical properties of materials and their significance to design and manufacturing.
3. Conduct tensile, hardness, and other tests of material properties and interpret the results of those tests.
4. Prepare metallographic specimens for microscopic inspection of material structures.
5. Describe what alloys are and the significance of the structure of alloys.
6. Identify the mechanisms involved in heat treatment and how heat treatment is used to vary material properties.
7. Perform heat treatment on various alloys and investigated the effects of that treatment on material properties.
8. Classify the production, characteristics, and application of steels and stainless steels.
9. Describe the characteristics and applications of non-ferrous alloys.
10. Identify the general categories of polymer materials and their properties.
11. Identify polymers given design requirements such as mechanical and physical properties and operating environment.
12. Describe the structure, properties, and applications of ceramics and composite materials.
13. Classify the concepts of various types of non-destructive testing including dye-penetrant, magnetic particle, radiographic, ultrasonic, and eddy current.
14. Perform dye-penetrant and magnetic particle inspection.

TOPIC OUTLINE:

1. Production of metals from ores
2. Manufacture of Steels
3. Identification of Ferrous and Non-Ferrous Metals
4. Mechanical properties of materials.
5. Testing of mechanical properties.
6. Physical properties of materials.
7. Metal Structures.
8. Metal Alloys.
9. Heat treatment and hardenability of ferrous and non-ferrous metals.
10. Steel and stainless steel properties and processing.
11. Non-ferrous materials
12. Non-destructive testing
13. Polymers
14. Ceramics
15. Composite materials.

Description of Assessment and/or Evaluation of Student Learning

Quiz 1	Chapters 1,2,3,4	150 points
Quiz 2	Chapters 5,7,8	150 points
Quiz 3	Chapters 9,10,12,13	150 points
	Final Comprehensive	300 points
	Total Quiz/Final	750 points
Heat-Treat Lab (Group)		125 points
Heat-Treat Lab (Report)		125 points
	Total Lab	250 points
Quiz	450 points	900-1000 A
Final	300 points	800- 899 B
Lab/Report	250 points	700- 799 C
		600- 699 D
	1000 total points	below- 599 F

Master Syllabi and Working Syllabi (if both are used)

COURSE DESCRIPTION:

The properties of engineering materials. Mechanical and physical properties, testing, and heat treatment of metals are covered. Structures and properties of polymers, ceramics, and composite materials are also covered. Basic principles of chemistry are introduced as required for understanding.

COURSE GOALS:

The student will:

15. Identify the major categories of engineering materials and their applications.
16. Describe the basic mechanical and physical properties of materials and their significance to design and manufacturing.
17. Conduct tensile, hardness, and other tests of material properties and interpret the results of those tests.
18. Prepare metallographic specimens for microscopic inspection of material structures.
19. Describe what alloys are and the significance of the structure of alloys.
20. Identify the mechanisms involved in heat treatment and how heat treatment is used to vary material properties.
21. Perform heat treatment on various alloys and investigated the effects of that treatment on material properties.
22. Classify the production, characteristics, and application of steels and stainless steels.
23. Describe the characteristics and applications of non-ferrous alloys.
24. Identify the general categories of polymer materials and their properties.

25. Identify polymers given design requirements such as mechanical and physical properties and operating environment.
26. Describe the structure, properties, and applications of ceramics and composite materials.
27. Classify the concepts of various types of non-destructive testing including dye-penetrant, magnetic particle, radiographic, ultrasonic, and eddy current.
28. Perform dye-penetrant and magnetic particle inspection.

TOPIC OUTLINE:

16. Production of metals from ores
17. Manufacture of Steels
18. Identification of Ferrous and Non-Ferrous Metals
19. Mechanical properties of materials.
20. Testing of mechanical properties.
21. Physical properties of materials.
22. Metal Structures.
23. Metal Alloys.
24. Heat treatment and hardenability of ferrous and non-ferrous metals.
25. Steel and stainless steel properties and processing.
26. Non-ferrous materials
27. Non-destructive testing
28. Polymers
29. Ceramics
30. Composite materials.

TEXTS AND MANUALS:

Practical Metallurgy and Materials of Industry, 5th Edition, by John E. Neely, Prentice Hall Publishers.

MATERIALS TECHNOLOGY COURSE OUTLINE 3 CREDIT

8:00-10:45 Wednesday
INSTRUCTOR: STEVE. SYKES
HRS 773-3420 EXT 215 (OFFICE)
448-6622 (HOME)
sykes@edisonohio.edu
ssykes@erinet.com

TEXT: PRACTICAL METALLURGY @ MATERIALS OF INDUSTRY (NEELY)

WEEKLY SCHEDULE OF TOPICS & ASSIGNMENTS

WEEK	LECTURE/DEMONSTRATIONS	CHAPTER
8/28	Introduction	1
	Extracting Metal from Ores	1
9/4	Extracting Metal from Ores	2
	The Manufacture of Steel Products	14

9/11	Identification and Selection of Iron & Steel	5
	Identification of Non-ferrous Metals	14
9/18	QUIZ 1	*
	Mechanical & Physical Properties of Steel	3
9/25	Mechanical & Physical Properties of Steel	3
10/2	Mechanical & Physical Properties of Steel	3
10/9	Crystalline Structures of Metals	4
	Phase Diagrams & Iron-Carbon Diagram	8
10/16	QUIZ 2	*
	Hardening & Tempering of Plain Carbon Steel	11
10/23	Annealing, Normalizing & Stress Relieving	10
10/30	Hardenability of Steels & Tempered Martensite	12
11/6	Heat-Treating Equipment & Procedures	9
11/13	Quiz 3	*
	Rockwell & Brinell Hardness Testers	26
	Non-destructive Testing	
11/20	Plastics & Elastomers	25
11/27	Ceramic Materials	23
12/4	Make-up, Review for Final	*
12/11	Final	*

EVALUATION STANDARDS

Quiz 1	Chapters 1,2,3,4	150 points
Quiz 2	Chapters 5,7,8	150 points
Quiz 3	Chapters 9,10,12,13	150 points
	Final Comprehensive	300 points
	Total Quiz/Final	750 points
Heat-Treat Lab (Group)		125 points
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Quiz	450 points	900-1000 A

Final	300 points	800- 899 B
Lab/Report	250 points	700- 799 C
		600- 699 D
	1000 total points	below- 599 F

Materials Technology
Policy Statements

The Material covered in this course goes beyond the scope of the textbook. The Instructor will Supplement assigned readings with addition information in the form of handouts, pamphlets, and
operation (job) sheets. Note taking will be helpful, as it provides a ready reference before a quiz
and/or exam.
Attendance, promptness, class participation and response is encouraged. (**Failure to attend class will adversely affect the final grade).**
Work that is missed due to absence should be made up as soon as possible. Only partial credit will
be given for work turned in late.
In case of absence make-up quiz may be given by the discretion of the instructor.
I subscribe to the philosophy that education is a two-way street. It's not just the teacher's responsibility to
teach, but it is also the student's responsibility to learn. Therefore, I expect that you will:
Read the chapter's prior to the class.
Come prepared to ask/answer questions and enter into discussion.
Read current literature, i.e. newspaper, trade magazines, etc., and bring appropriate ideas into discussion.
Attend class (if there are excessive absences, your final grade may be reduced one letter).
Be prompt (class will start at the designated time).
Please review college policy on student rights, responsibilities, and conduct.
If you require reasonable accommodations because of a physical, mental or learning disability, please notify the instructor of this course within the first two weeks of the term.
Generally speaking, the lab will be locked after class, but may be open for any students at the discretion of the instructor. However, the students will be held responsible for care of the equipment and a clean work area.
The college is not responsible for lost or stolen items.
Goggles or safety glasses must be worn in all areas of the lab.
Report any broken equipment as soon as possible, so repairs can be made
Obey all safety rules relating to shop equipment. (No horse play)
Every effort has been made to construct this course in a logical manner. However, some variables
(class size, etc.) may cause changes in activities, field trips and assignments. Students will be advised well in advance of such activity .

Additional Documentation

Engineering Materials - Learning Outcomes	MFG 120S - Course Goals

List how engineering materials, metals, polymers, ceramics, and composites are related in origin and structural characteristics. (crystal structure, organic composition and properties, basic chemistry and atomic structure)	1	
List the properties that must be reviewed when making materials selections. (modulus of elasticity, tensile strength, yield strength, shear strength)	1,2,3	
Differentiate between the properties of stiffness, strength, and toughness. (stiffness – modulus, strength – tensile strength, yield, shear strength)	2,3	
Define vocabulary used in steel terminology.	5,8	
Describe how steels are made. (melting, casting, hot rolling, cold rolling)	8	
List and describe the common heat treatments used on steels. (annealing – heat and slow cool, quenching - fast cooling, tempering - low temperature reheating)	6,7	
Describe how cold finishing working and alloy additions alter steel properties. (increase strength, lower ductility)	8	
Specify tool steels based upon their properties and the heat treatment to which they have been subjected. (evaluate operating temperature, strength, stiffness, cyclic loading)	6,7,8	
Develop a guideline on how to screen candidate materials and arrive at the proper choice.	2,3,4,5,8,9,10	
Include a basic understanding of polymers, aluminum, and copper	9,10	

OBR Use	Action
Approved	
Additional Information Requested	
Rejected	
Date	