

MATERIALS AND PROCESSES 100

Course Description

This course covers ... <Prerequisites: none>an introduction to basic types of materials and processes of industry. A study of the micro/macro structures and common properties of materials as well as primary and secondary stages of material production from securing raw materials to producing assemblies and finished products. Common material "form-changing" processes (forming, separating, and combining) will be performed and selected material testing experiments will be conducted.

(Noncredit course: 20 lect/pres hrs, 50 lab hrs, 20 other hrs)

Course Focus

The long term goal of technology education is to promote technological literacy for all. Content and activities involve students in discovering, creating, problem solving, and constructing with a variety of tools, materials and processes. The program provides a balanced mix of conceptual, historical, and practical information.

Text and References

Wright, R.T. (1990). Processes of Manufacturing. South Holland, IL.: The Goodheart-Wilcox Company, Inc. (ISBN#0-87006-811-3)

McShear, J. et al. (1990). Materials Technology: Modular Courses in Technology. Essex, England: Oliver&Boyd in association with the Longman Group, Ltd. Sponsored by the National Center for School Technology.
(ISBN #0-05-003395-6) Purchased in U.S.A. through Creative Learning Systems, Inc.

Note folder with loose pages. Pencil and Pen

Supplemental Text: May include but will not be limited to.

Supplemental AV Materials: As needed or becomes available will be used.

Course Goals

The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives (Addendum A). (*designates a CRUCIAL goal)

- 1.* activate safety rules fire drill (PO 4)
- 2.* activate management safety rules (PO 4)
- 3.* analyze chemical MSDS safety (PO 4)
- 4.* develop performance chart lab safety

5. describe raw materials processes
6. list raw materials
7. list composite material properties
8. define metallic properties
9. list polymeric properties
10. describe polymeric characteristic
11. describe metallic characteristics
12. describe composite characteristics
13. describe standard stock processing
14. define forming separating combining processes
15. interpret final assembly products
16. list produce subassembly processes
17. define building blocks atomic structures
18. label subatomic protons neutrons electrons particles
19. define nucleus, atomic number, atomic weight, atoms
20. build model atom
21. list atomic number of energy shells, and subshell orbits, atom
22. describe characteristics valence shells
23. deliver presentation atomic bonding
24. define materials molecular structure
25. categorize metallic covalent ionic atom bonds
26. compare negative, positive, charged atoms
27. classify metallic bonded materials
28. analyze covalent bonded polymeric material
29. list covalent bonded materials
30. contrast ionic, covalent, bonds
31. list ionic bonded materials
32. analyze gas, liquid, solid, molecular structures
33. categorize crystalline cell metallic materials
34. compare ferrous, nonferrous materials (PO 4)
35. categorize stock forms metallics
36. calculate square feet, linear feet, pounds, metallic materials (PO 4)
37. contrast metallic, strength, hardness carbon content
38. list ferrous, nonferrous metallics
39. compare natural synthetic polymerization
40. list natural polymer standard stock
41. define synthetic polymer standard stock
42. measure square feet linear feet pounds gallons synthetic polymers
43. label hardwoods, softwoods characteristics
44. contrast thermoplastic, thermosetting plastics
45. list thermoplastic, thermosetting, plastics materials
46. list ceramic properties
47. define shear, impact strength
48. define toughness brittleness hardness ductility materials
49. define elasticity malleability fatigue materials
50. define moisture shape structure density physical properties

51. list conductivity insulation dielectric materials properties
52. demonstrate magnetic properties materials
53. demonstrate thermal properties materials
54. address optical properties materials
55. demonstrate chemical properties materials
56. demonstrate testing materials
57. demonstrate materials, processes content command
58. define tension, compression, torsion strength

Student Contributions

Suggested Activities may include, but will not be limited to. The student will:

1. Attend class on regular bases.
2. Follow school dress codes and rules and regulations.
3. Complete and hand in all assignments and projects on a timely basis.
4. Exit class with permission only.
5. Keep and maintain a class notes folder (graded) once each quarter.
6. Take all exams and quizzes.
7. Identify and practice all safety rules for tools, equipment and processes.
8. Demonstrate proper use and care of all tools and equipment used.
9. Demonstrate basic knowledge of drafting skills in reading and interpreting technical drawings etc.
10. Describe job opportunities and careers related to specific industrial systems.
11. Analyze the influence and effects of processes of manufacturing on society, culture, and the environment.
12. Solve math and measurement problems as they relate to specific technology processes of manufacturing.
13. Reinforce vocabulary and reading comprehension skills in the processes of manufacturing technology.
14. Maintain and service equipment in order to maintain and extend its useful life.
15. Understand and demonstrate the system models and apply them to the study of the four systems of technology.
16. Solve problems and make decisions involving labor and materials resources, processes, and technological systems in the processes of manufacturing.

Course Evaluation

Your performance objective and exams will be translated to points and the points to grades. There are 167 points possible and grades will be earned as follows: A = 155 to 167, B = 139 to 154, C = 122 to 138, D = 100 to 121.

Course Schedule

Class meets 50min. /day, five days/week for four nine week quarters. 180 hrs.
Minimum Public School Contact Hours: 128hrs.

ADDENDUM A

PERFORMANCE OBJECTIVES

4. The student will be allowed references. The student will develop performance chart lab safety. Performance will be satisfactory if lab safety is developed and the development is the same as (OSHA SCHOOL LAB CHECK LIST) and all of the lab safety is developed in allotted time frame and the development of the lab safety endures for duration of the class. The following Content Goals are related to this PO: 1, 2, 3, 4, 34, 36.

37. The student will be allowed references. The student will contrast metallic, strength, hardness carbon content. Performance will be satisfactory if carbon content is contrasted and the contrasting is consistent with (text) and carbon content is contrasted in (writing).

Developed/Revised: 03-19-2002