Course Outline – Material Science Seminar

Course Topic: Material Science
Recommended Contact Hours: 15 hrs.

Course Description:

This this course is designed to provide technically oriented students with a fundamental understanding of materials science. topics to be included would encompass material selection, heat treating, welding metallurgy and failure analyses. students would come to learn what materials to select for proper applications, how alloys are heat treated to improve their mechanical properties, what the metallurgical science is behind the different types of welding procedures and lastly, why things break.

this course is designed to focus on manufacturing shop floor people who are building or repairing electrical and mechanical components on machines.
it will take a fundamental approach typically encompassing two half day sessions beginning with an elemental understanding of what metals really are and progressing towards their uses in modern day manufacturing.

Course Outcomes and Objectives

MS-1 The student will be able to use Rockwell and Brinell hardness machines on a variety of ferrous metals to demonstrate their hardnesses.

MS-2 The student will be able to perform a tensile test utilizing a standard tensile coupon and breaking it to failure.

MS-3 The student will be able to analyze the yield, tensile and breaking strengths as well as % elongation and be able to find the yield point in materials where none is obvious.

MS-4 The student will be able to demonstrate the steps involved in the preparation of a metallographic sample for viewing on a bench microscope.

MS-5 The student will develop any number of cooling curves associated with a given alloy in Type I, II and III phase diagrams.

MS-6 The student will name the different patterns exhibited by any number of failed parts and provide the reasons for failure as well as the recommended design or application change.

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MS-7 The student will accompany the instructor to two local facilities to view physical test practices and heat treatments talked about in the classroom.

MS-8 The student will be able to apply techniques learned in this course in an industrial setting.

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