Miami Dade College

GENERAL INFORMATION	
Course Prefix/Number: ETI 2425C	Course Title: Metallurgical Properties and Dynamics
Number of Credits: 3 hr. lecture	
Degree Type	☐ B.A. ☐ B.S. ☐ B.A.S ☐ A.A. ☒ A.S. ☐ A.A.S. ☐ C.C.C. ☐ A.T.C. ☐ V.C.C
Date Submitted: 11-01-2007	Effective Year/Term: 2007-2
☒ New Course Competency ☐ Revised Course Competency	
Course to be designated as a General Education course (part of the 36 hours of A.A. Gen. Ed. coursework): ☐ Yes ☒ No	
The above course links to the following Learning Outcomes: ☒ Communication ☒ Numbers / Data ☒ Critical thinking ☐ Information Literacy ☐ Cultural / Global Perspective ☐ Social Responsibility ☐ Ethical Issues ☐ Computer / Technology Usage ☐ Aesthetic / Creative Activities ☒ Environmental Responsibility	
Course Description (limit to 50 words or less): This course provides students who are preparing for occupations in industrial maintenance with a foundation in the principles of the metallurgy of steel. Students learn about the thermal, physical, and chemical properties of steel. Prerequisite(s): PHY1025. Laboratory fee. A.S. degree credit only. (2 hr lecture; 2 hr lab)	
Prerequisite(s): PHY1025	Co requisite(s): none

Course Competencies:

Competency 1: The student will demonstrate an understanding of the basic principles of metallurgy by:

1. Describing the physical properties of metal.
2. Explaining the mechanical properties of metal.
3. Identifying metals and alloys.
4. Describing the different properties of metals.
5. Defining process, extractive, and physical metallurgy.
6. Outlining practical examples of metallurgy in modern industry.

Competency 2: The student will demonstrate an understanding of the metallurgical process by:

1. Explaining isothermal transformation diagrams.
2. Describing various types of tempering and the application of each.
3. Describing basic surface hardening methods and the application of each.
4. Defining transformation temperatures.
5. Explaining crystal growth.

Competency 3: The student will demonstrate an understanding of the failure and deformation of metal by:

Revision Date: 10-30-2007

Approved By Academic Dean Date: _____ Reviewed By Director of Academic Programs Date: _____

1. Defining deformation of metal.
2. Explaining the terms “ductility” and “brittleness”.
3. Discussing work hardening.

Competency 4: The student will demonstrate an understanding of phase diagrams by:

1. Identifying the different types of systems: iron-chromium, iron-chromium-carbon system, iron-chromium nickel system.
2. Explaining phase-diagrams for specific alloy systems.
3. Explaining different structural forms of steel.
4. Describing iron-carbon phase diagrams.
5. Identifying temperature change and mechanical properties.

Competency 5: The student will demonstrate an understanding of the properties of metals by:

1. Defining the “hardness” of metals.
2. Discussing the different testing methods for hardness.
3. Explaining the comparison between hardness testing materials.
4. Outlining the mechanical properties of metal.
5. Defining the chemical properties of metals.
6. Explaining the electrical properties of metals.
7. Describing the magnetic properties of metals.
8. Discussing the thermal properties of metals.
9. Reviewing the comparison charts of metal properties.

Competency 6: The student will demonstrate an understanding of ferrous metallurgy by:

1. Discussing the composition of steel.
2. Explaining what the steel numbering system is.
3. Comparing the differences between steel and iron.
4. Describing alloying elements.
5. Identifying the different types of steel.
6. Defining “cast iron” and discussing how it is manufactured.
7. Defining “wrought iron”.
8. Discussing the steel-making process.
9. Describing iron ore.
10. Defining blast furnaces and steel-making furnaces.
11. Explaining the process of ingots.
12. Describing continuous casting.
13. Discussing pollution control.