Miami Dade College

Course Description

ETI2425C | Metallurgical Properties and Dynamics | 3.00 credits

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: PHY 1025.

Course Competencies

Competency 1: The student will comprehend the fundamental principles of metallurgy by:

1. Examining the atomic structure and bonding of steel and its implications on material properties
2. Differentiating between various types of steel and their respective applications in industrial maintenance
3. Investigating the historical development of steel production and its impact on modern industry

Competency 2: The student will analyze the thermal, physical, and chemical properties of steel by:

1. Conducting experiments to measure and interpret the thermal conductivity and expansion of steel under varying temperatures
2. Evaluating the mechanical properties of steel through tensile and hardness testing
3. Assessing the effects of alloying elements on the corrosion resistance and strength of steel

Competency 3: The student will apply knowledge of steel metallurgy in practical scenarios by:

1. Developing maintenance protocols that consider the properties of steel in different industrial applications
2. Troubleshooting common issues related to steel performance in machinery and structural components
3. Creating case studies that illustrate best practices for selecting and maintaining steel materials in industrial settings

Competency 4: The student will engage in collaborative learning experiences related to steel metallurgy by:

1. Participating in group projects that focus on analyzing real-world applications of steel in industrial maintenance
2. Presenting findings from research on emerging technologies in steel production and treatment
3. Facilitating discussions on the environmental impact of steel manufacturing and maintenance practices

Learning Outcomes

- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information