

WELD 1263 : Metallurgy & Heat Treatment

3 credit hours (3 lecture/0 lab)

The student will describe the physical properties of various metals and alloys, the classification of ferrous and non-ferrous steel, the effect of alloying elements, and the results of heat treatment.

Course Outcomes

At the end of this course, students will be able to:

1. Define the various structures of materials in crystal lattice formation.
2. Explain the normalizing and annealing processes for metals.
3. Describe the purpose and uses of the time-temperature transformation curve.
4. Describe the tempering process and its uses.
5. Describe the effect of welding on microstructure.
6. Describe the effects of machining on microstructure.
7. Describe the solidification process.
8. List the various ingredients of cast irons, steels, and stainless steels.
9. Describe the processes used to refine iron ore in the production of cast iron and steels.
10. Describe the processes used to produce steels, cast irons, and stainless steel.
11. Recognize the major regions and ranges of the iron carbon phase diagram.
12. List and describe the various alloying elements in ferrous metals and the purpose of each.
13. Define heat treatment and the factors that influence its effectiveness.
14. Describe the phases of the quenching process and the various media used.