Material Science (MSE)

MSE 1000 Material Science Fundamentals-Metallurgy .....3 Credit Hours
Equivalent: APT 8500
Prerequisite: Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).
This course will provide the student a basic knowledge of the theory and practice of metallurgy, including the nature, manufacturing and principles of heat treated metals. Students will be introduced to the scope and applications of metallurgy in industry, and the treatment methods used for various materials based on desired outcomes. Material structure will be studied at the molecular level, including exposure to nanotechnologies as they relate to the scientific changes being explored in forming composite materials. BILLABLE CONTACT HOURS: 3

MSE 1100 Metallography .....3 Credit Hours
English/ESL Placement: Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).
This course provides the student with the basics of metallographic study. The course covers all the practical methods of cutting, mounting, polishing and etching of samples. Emphasis will be on the interpretation of microstructures. The samples include both ferrous and non-ferrous metals from real world applications. The student will study the background information of the metal samples prepared and assemble a final booklet of their work. The fundamental stages of heat treated conditions will be studied using a wide variety of alloys. BILLABLE CONTACT HOURS: 3

MSE 1200 Welding Metallurgy .....3 Credit Hours
English/ESL Placement: Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).
This course is designed to teach the micro structural aspects of all welding processes. This course will explore the metallurgy of welding, the types of steel and their manufacture, certain welding methods and processes, temperature changes during welding, and the contribution of alloying elements in steel to welded metal behavior. Shop floor welded pieces will be examined metallographically to see the structures discussed in the classroom as well as tensile and hardness testing to demonstrate welding integrity. BILLABLE CONTACT HOURS: 3