

Materials Science and Engineering

Program Educational Objectives

Within the scope of the MSE mission, the objectives of the Materials Engineering Program are to produce graduates who:

- A. practice materials engineering in a broad range of industries including materials production, semiconductors, medical/environmental, consumer products, and transportation products.
- B. engage in advanced study in materials and related or complementary fields.

Program Outcomes

Graduates in Materials Science and engineering will have demonstrated the following at the time of graduation:

- a. an ability to apply knowledge of mathematics, science, and engineering
- b. an ability to design and conduct experiments, as well as to analyze and interpret data
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. an ability to function on multi-disciplinary teams
- e. an ability to identify, formulate, and solve engineering problems
- f. an understanding of professional and ethical responsibility
- g. an ability to communicate effectively
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. a recognition of the need for and an ability to engage in life-long learning
- j. a knowledge of contemporary issues
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- l. an ability to apply advanced science (such as chemistry and physics) and engineering principles to materials systems
- m. an integrated understanding of the scientific and engineering principles underlying the four major elements of the field (structure, properties, processing, & performance)
- n. an ability to apply and integrate knowledge from each of the above four elements of the field to solve materials selection and design problems
- o. an ability to utilize experimental, statistical and computational methods consistent with the goals of the program.
- p. mastery of creative, independent, problem solving skills, under time and resource constraints, in a broad range of materials-related applications critical to the success of the final product.
- q. experience in materials engineering practice through co-ops or internships in industry, national laboratories, or other funded research work.
- r. hands-on skills with a broad range of modern materials processing and characterization equipment and methods, with special in-depth concentration in two student-selected areas from among ceramic, electronic, metallic, and polymeric materials