Program 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. respond to environmental, social, political, ethical and economic constraints to improve the quality of life in Iowa and the world.

C. work independently and in teams and are proficient in written, oral and graphical communication.

D. engage in lifelong learning in response to the rapidly expanding knowledge base and changing environment of our world.

E. 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