MSE 4420: Capstone Engineering Design II (required)

Catalog Description: (3-1-6)  
Prerequisites: MSE 4410 Engineering Capstone Design I  
A team problem-solving approach is used to work on a project developed in cooperation with industry. Weekly communications, both oral and written, are required.


Prepared by: Meisha L. Shofner

Topics Covered:
1. Engineering design methodology
2. Technical communication
3. Decision making strategies
4. Experimental design
5. Data analysis

Course Outcomes:
By the end of the course, the successful student will be able to:
1. Effectively communicate technical information in written and oral formats.
2. Collaborate with a team of peers to undertake a design project.
3. Recognize the professional and ethical responsibilities of a materials engineer.
4. Identify and formulate a materials engineering design problem.
5. Define and prioritize realistic constraints for a materials engineering design problem.
6. Critically analyze the results of processing and/or characterization experiments.
7. Apply integrated knowledge of the structure, properties, processing, and performance of materials to solve a design problem.
Correlation between Course Outcomes and Student Outcomes:

<table>
<thead>
<tr>
<th>Course Outcomes</th>
<th>Student Outcomes</th>
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<tbody>
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<td>a    b   c   d   e   f   g   h   i   j   k</td>
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| Entire Course | a   b   c   d   e   f   g   h   i   j   k   |
|---------------|------|------|------|------|------|------|------|------|------|------|
| 1             | 3    | 3    | 3    | 1    | 3    | 3    | 3    | 2    | 0    | 1    | 2    |

0 = None or insignificant; 1 = Some; 2 = Moderate; 3 = Strong

School of Materials Science and Engineering Student Outcomes:

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 multidisciplinary 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