

**United States Naval Academy
Mechanical Engineering Department**

EM215 Introduction to Mechanical Engineering

Catalog Description: EM215 Introduction to Mechanical Engineering **Credit:** 2 (1-2-2)

This is an overview course that introduces the student to the main areas of mechanical engineering, mechanics, materials, and thermo-science. In addition, it provides background in visualization skills and the design process. Projects are used to enhance the understanding of mechanical engineering and the design process.

Prerequisites: None

Corequisites: None

Textbooks: Duff, J. M., Ross, W. A., Freehand Sketching for Engineering Design

Course Director: Prof. S. M. Miner

Objectives¹:

1. To provide the student with an overview of the main areas of mechanical engineering. (a)
2. To introduce the student to the design process. (b,d)
3. To provide the student with some basic visualization skills. (a,b)

Course Content:

No.	Topic or Subtopic	hrs.
1	Design Process	3
2	Orthographic Sketching	4
3	Isometric Sketching	4
4	Sections / Dimensions	4
5	Solid Modeling	5
6	Thermo-Fluids	4
7	Mechanics	4
8	Materials Science	4
9	Design Project	12

Evaluation:

- | | | |
|-----------------------------|---|--|
| 1. Quizzes | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 2. Homework | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Exams | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Laboratory Reports | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Oral Presentations | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6. Design Reports/Notebooks | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

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|------------------------------------|---|--|
| 7. Prototypes/Demonstrations | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 8. Projects | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 9. any other evaluation tools used | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

Acquired Abilities²:

- 1.1 Students will be able to apply Bernoulli's equation to fluid flow. (3,4)
- 1.2 Students will appreciate the effect of geometry on beam stiffness and strength. (3,4)
- 1.3 Students will appreciate the effect of heat treating on material properties. (3,4)
- 2.1 Students will understand the steps in the design process. (2,3,8)
- 2.2 Students will use the design process to complete a team project. (5,6,7,8)
- 3.1 Students will be able to create orthographic and isometric sketches. (2,3,8)
- 3.2 Students will be able to interpret orthographic and isometric sketches. (2,3,7)

Date of Latest Revision: 24 SEP 2001

¹ Letters in parenthesis refer to the [Program Objectives](#) of the [Mechanical Engineering Program](#).

² Numbers in parenthesis refer to the evaluation methods used to assess student performance.