

## Homework Rules

A complete description of the rules and procedures for homework assignments is provided in the course syllabus. The following is a list of some of the key points:

1. You must include a title page to your homework and do not include any work on it.
2. If you are using engineer paper, do not use the back side because it is too difficult to read.
3. Provide your work and answers to the problems in the same order they were asked.
4. Unless otherwise instructed, you must solve the homework by hand. Only use a computer or a calculator for doing basic arithmetic or to verify your answers.
5. You must show all work or you will not receive credit for the answer.
6. You must finish all calculations. For example,  $3\pi$ ,  $5/8$ , and  $\sqrt{14}$  are not finished answers and will be graded as incorrect. Correct answers (depending on significant digits) would be 9.425, 0.625, and 3.742, respectively.
7. Answers must include proper units or the answer will be graded as incorrect.
8. You must draw a box around your final answer or it will be graded as incorrect.
9. Never box intermediate results or your answers will be graded as incorrect.
10. Be sure your homework is clear, neat, and organized or points will be deducted.
11. Staple the assignment in the upper-left corner with no additional binding.
12. Homework is due by 4:59pm on the due date, but submitting in class is preferred. Homework not submitted in class shall be submitted to the ECE office to be placed in my mailbox.
13. Late homework will not be accepted and will be given a grade of zero. There cannot be any exceptions to this rule due to the size of the class.

## Reading

### Required Reading

- Course Syllabus
- Chapter 1, pp. 3-23.
- Chapter 2, pp. 30-52.

## Problems

### Problem 1 – Grading Calculations

#### Part a

Jane Doe is halfway through her semester course in EE-3321 Electromagnetic Field Theory. On assignments 1 to 6 she scored 100%, 90%, 85%, 95%, 87%, and 98%. On the midterm exam, she scored 92%. She has one unexcused absence and does not respond to class polls or class discussions so she has an 80% in class participation. Based on the breakdown given in the course syllabus, what is Jane's current grade in the class?

#### Part b

By the end of the semester, Jane has a 95% homework average, an 88% average on her midterm exams, and an 85% for class participation. Based on the breakdown given in the course syllabus, what grade does Jane need on her final exam to get an overall A in the class?

## Problem 2 – Unit Vectors

Given a first point  $(-1.0 \text{ m}, 2.5 \text{ m}, -1.7 \text{ m})$  and a second point  $(3.0 \text{ m}, -1.8 \text{ m}, 2.4 \text{ m})$ , calculate a unit vector  $\hat{a}$  in the direction from point 2 to point 1. Report your answers to four digits of precision. Draw a coordinate system that visualizes the points and unit vector.

## Problem 3 – Vector Arithmetic

Given the following two vectors,

$$\vec{A} = (2.0 \text{ m})\hat{a}_x - (3.2 \text{ m})\hat{a}_z$$

$$\vec{B} = (1.7 \text{ m})\hat{a}_x + (2.1 \text{ m})\hat{a}_y$$

- Calculate the dot product  $\vec{A} \cdot \vec{B}$ .
- Calculate the cross product  $\vec{A} \times \vec{B}$ .
- Calculate the angle  $\theta_{AB}$  between the vectors.
- Calculate the projection of vector  $\vec{A}$  onto vector  $\vec{B}$ .
- Find a vector  $\vec{C}$  that is perpendicular to both  $\vec{A}$  and  $\vec{B}$ .

## Problem 4 – Volume

The figure below shows a parallelepiped and labels the positions of each vertex in Cartesian coordinates.

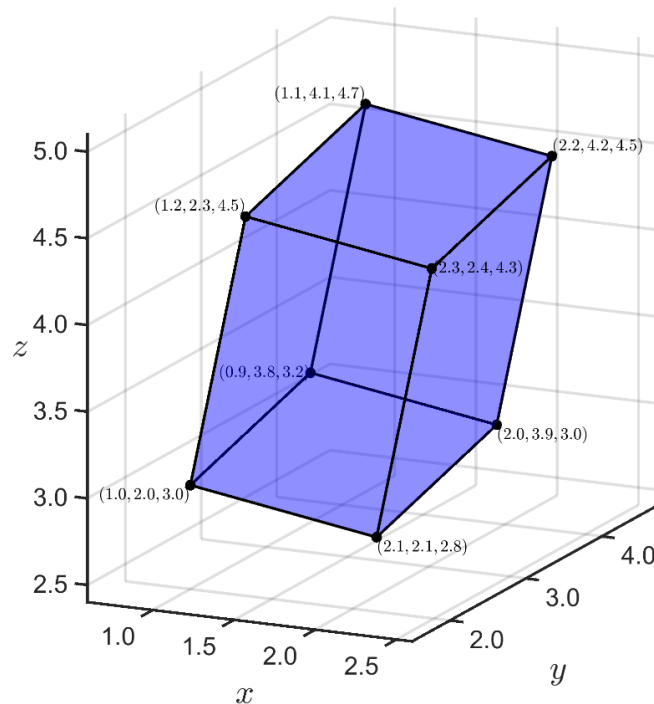


Figure 1. Vertices of a parallelepiped. Units are in centimeters (cm).

- Calculate the volume of the parallelepiped in units of cubic inches ( $\text{in}^3$ ).
- Calculate the surface area of the parallelepiped in units of square inches ( $\text{in}^2$ ).