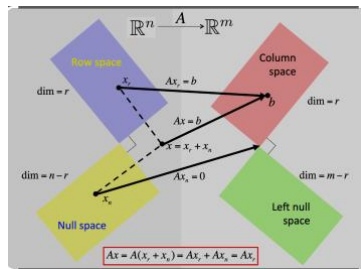


**Matrices & Linear Equations**  
**Math 229**  
**Spring 2023**  
**MW 2-3; Engineering B 105**



**Instructor** Hortensia Soto, PhD (Dr. Soto)



**Email** [hortensia.soto@colostate.edu](mailto:hortensia.soto@colostate.edu)  
**Office** Weber 216  
**Office Hours** Monday 3-4; Tuesday 11-12; Wednesday 1-2  
**Credits** 2 credits  
**Prerequisites** Math 117 and Math 118

**Course description:** Geometric interpretations in  $\mathbb{R}^2$  and  $\mathbb{R}^3$  of core linear algebra concepts including vector spaces, matrices, linear transformations, span, basis, and linear independence with applications.

**Instructor Description:** This course will focus on linear algebra concepts but sole in  $\mathbb{R}^2$  and  $\mathbb{R}^3$ . Students will have opportunities to engage with the concepts in physical environments and through technology, before being introduced to the symbolism and formalism. My hope is that these activities will help the students ground the concepts and make sense of the computations in  $\mathbb{R}^2$  and  $\mathbb{R}^3$ , so that they are better prepared to work with concepts in higher dimensions. The goals for the course are:

1. perform computations required for linear algebra,
2. develop geometric interpretations of linear algebra computations, and
3. apply and connect linear algebra to meaningful contexts outside of the mathematics classroom.

**Required Materials:**

- ✓ *Understanding Linear Algebra* by David Austin <https://scholarworks.gvsu.edu/books/26/>
- ✓ A fun meter, please bring that to class every day
- ✓ Ideas and creativity to share
- ✓ Knowledge that it is ok to make mistakes – we will celebrate them and learn from them

**Class Structure:** This course will be taught using inquiry-based learning (IBL), which means that I will mostly facilitate mathematics discussions and you will present your work and engage in small group discussions. Occasionally, I will lecture to introduce new ideas or to synthesize concepts. I encourage you all to read the chapters before class – they are rather short and introduce the main definitions. Everything that we do is on purpose and with a purpose.

**Method of Evaluation:**

- **Homework (20%):** Homework will be assigned every class period and it will generally be due on Wednesdays at 3 pm. Here are some guidelines to follow:
  - ✓ Start the homework ASAP! **Late homework will not be accepted.**
  - ✓ You will always have a class period to ask about homework, so homework assigned on Mondays won't be due until 2<sup>nd</sup> Wednesday after it was assigned.
  - ✓ Work smart, work together.
  - ✓ Be neat, staple all homework together and in order.
  - ✓ Each exercise will be worth 3 points. Each homework packet will be scaled to 20 points.
  - ✓ Mean what you say and say what you mean!
  - ✓ Keep an organized file of all homework. It will make a good study guide for the tests and final.
- **Projects (20%):** Projects will be assigned as either individual assignments or group assignments. The projects are an opportunity to explore and discover linear algebra concepts. Some projects will be completed in class and others will be completed outside of class. Here are some guidelines to follow:
  - ✓ **Late submissions will not be accepted.**
  - ✓ Start the project ASAP and come prepared (read the project before you meet, do the homework, etc)
  - ✓ Use your partners and make sure everyone contributes to the learning of the material. According to a recent survey of businesses the reason for termination 92% of the time is the employees' inability to work as a team member.
  - ✓ Know how to contact everyone in the group.
  - ✓ Keep an organized file of all the projects. It will make an excellent study guide for the tests and final.
  - ✓ The projects will be assessed for *form, grammar, and good taste* as well as *content*.
  - ✓ **Late projects will not be accepted.**
  - ✓ Have fun with the projects!
- **Two in-class exams (40%):** There will be two in-class exams – each worth 20% of your grade. **Make up on exams will not be permitted.**
- **In-class final (20%):** There will be a comprehensive exam. **You must take the final at the scheduled time.**

**Course Grade:** The following scale will be used in determining course grades.

90%-100% → A

80%-89% → B

70%-79% → C

60%-69% → D

Below 60% → F

**Note:** I will not use +/- grading.

**Missing Classwork and Materials:** If you missed a class, and missed receiving materials as a result, it is your responsibility to retrieve those materials from me or a classmate. Feel free to email me and I can send electronic copies of missed activities. *You are responsible for knowing the material regardless of if you miss a class.*

**Important Dates:**

- August 27: Last day to add a course
- September 4: Labor Day – No Classes
- Sept 6: Last day to drop a course without record entry
- November 10: Last day to withdraw from course
- November 18-26: Fall and Thanksgiving Break – No Classes
- December 8: Last Day of Classes
- Thursday, December 14: 11:50-1:50 Final (in this same classroom)

**CSU Policies**

**Principles of Community:** CSU Online supports the University's dedication to creating a collaborative and vibrant community as a foundation for learning, critical inquiry, and discovery. We aim to uphold these Principles of Community when engaging with one another and acting on behalf of the University.

- **Inclusion:** We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.
- **Integrity:** We are accountable for our actions and will act ethically and honestly in all our interactions.
- **Respect:** We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.
- **Service:** We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.
- **Social Justice:** We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

**Academic Honesty & Integrity:**

Academic misconduct will not be tolerated in any form. Students are responsible for adhering to the Academic Integrity Policy of the Colorado State University General Catalog and the Student Conduct Code. See <https://resolutioncenter.colostate.edu/wp-content/uploads/sites/32/2018/08/Student-Conduct-Code-v2018.pdf> for more information. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Student Resolution Center.

- **Collaboration** -- You are expected to collaborate with your classmates, but all work turned in must be your own. You must not copy solutions from others or use solutions

that are not your own. If you are unsure about the degree of collaboration that is acceptable, please ask me for clarification.

- **Cheating** -- Cheating includes using unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work or engaging in any behavior specifically prohibited by the instructor.
- **Plagiarism** -- Paraphrasing or quoting another's work without citing the source is a form of academic misconduct. Even inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is considered plagiarism. If you have any questions about using and citing sources, you are expected to ask for clarification.

Above all, a college education is a huge individual accomplishment, and you should be proud of this accomplishment, knowing that you approached this time in your life with honesty and integrity.

### **Support Services Available**

- **Tutors:** <http://tutoring.colostate.edu/>
- **University Counseling Center:** A variety of services are offered by the CSU Psychological Services Center (970-491-5212) including programs for reducing test anxiety and math anxiety, as well as programs for time management, test-taking skills, study strategies, memory and concentration enhancement. If you think that you may need help in one of these areas, please do not delay in investigating these services.
- **Student Disability Center:** This center is located in Student Services Building 116 and supports “students who have physical/learning disabilities as well as students who have chronic physical/mental illnesses or conditions that impact their ability to be a student.” *“We believe that disability/impairment/illness, etc. are all part of the human condition. While the majority of people in society may see these characteristics as deviant or defect, we do not. We see them as part of the diversity of humankind. We also understand that you are here to be a student in an environment that was not designed to easily integrate your diversity. Our partnership with you is aimed at ensuring you have an equitable opportunity to be as successful as you choose to be as a student and our values are embedded in social justice and civil rights.”*