Video Project 2

Research has shown that the effort you expend in reflecting on and clearly explaining your work solidifies your learning. The hope is that through the video and peer reviews of your classmates projects you will strengthen your knowledge of linear algebra, demonstrate your understanding and make connections. This final project connects to our course goals and the four general education goals for ASU as you

1. **extend course content**
2. **make connections to linear algebra**
3. **write and speak**
4. **reflect on classmates presentations and your own**

extension of course content	material presented orally extends class content in some creative way by explaining new material, examining connections to your interests, describing historical connections, or other new connections
alphabetized bullet point list of related class topics near the beginning of your presentation	orally and in writing presents an alphabetized bullet point list of topics we covered that relate to your topic—at least one topic from our class is on it. The list is near the beginning of your presentation.
depth of linear algebra connections	rich linear algebra connections, presented orally with correct mathematics and connecting to the language of our class when possible. depth can be achieved by reviewing related linear algebra we already covered and connecting it to your extension, if the extension is a program you create, history, real-life applications, etc., or it can be achieved with the linear algebra extensions themselves, if the topic is one we haven't covered.
if needed, consistent scholarly reference list that is professional	if applicable, cites credible, relevant sources and/or evidence that are situated within the context and purpose of the presentation
if applicable, cites image refs	image references, if any are needed, are listed professionally and cited appropriately, including authors
4 peer reviews	in-depth peer review of 4 classmates' presentations with topics different than yours (if possible) and detailing strengths, suggestions and what you learned (see below for questions)
self-reflection	in-depth self-reflection (see below for questions)
overall writing and speaking	contains writing and speaking that is clear, well organized, and professionally presented (it is ok to have some imperfect flow in your speech)
own words/self creation	products that you create yourself in your own words

Your tasks

You may work alone or in a group of up to 2 people and turn in one per group except you will each do your own peer review and self evaluation. Choose a topic related to linear algebra as evidenced by its connection to one or more topics we covered. Your project will be graded based on your linear algebra connections and the clarity, quality and creativity of your work.

1. Create a video presentation that

(a) extends class work related to your topic and linear algebra.

This could be covering new material, examining connections to your field (including programming linear algebra routines), or describing historical connections. The format is your choice. The **Sample format and topics** section lists several potential presentation formats and topics, just to get you started.

(b) connections and an alphabetized bullet point list of topics we covered that relates to your topic

Explains connections to linear algebra using the language from our course. In addition to incorporating these connections throughout your discussion, include an alphabetized bullet point list of topics we covered that relates to your topic. This is purely a list of topics we covered that connect. For example, say your extension incorporates determinants in some way. Then include that in your list. However, if it doesn't, then do not include.

(c) includes voice narration from **each** member of your group, if you work in a group of 2, or includes your voice narration if you work alone.

(d) a scholarly reference list, if needed.

Most projects will likely have scholarly sources although some may be extensions you create yourself. Faculty, past classes and past experiences can also be listed as references. Be sure to acknowledge the source citations of pictures. Any consistent style that is professional is fine. Be sure to acknowledge the source citations of pictures.

2. Prepare to record your video presentation by creating either a set of slides to use within the presentation **or** written notes to prepare for the presentation
3. Post a message in the final project **forum** containing your preferred name, the final project title, and a link to your video that we can access.
4. Conduct four peer reviews of classmates' videos, using the questions in the **Peer Reviews** section below. If possible, select people who chose a different topic than you did.
5. Critique your own work by completing the **Self-evaluation** detailed below.
6. Submit your peer reviews and self-evaluation (to me) as a PDF in the hand in assignment (not the forum) link on ASULearn, which goes just to me.

Sample formats

Your video presentation could take the form of:

(a) a summary of what you have learned (in your own words) after researching an extension of class is some way
(b) a summary of part of the book we didn't cover
(c) a summary of linear algebra connections to a different course you have already taken or will take
(d) a computer program you work on and report back on how that went—what was already available to you (or not) in the programming language you choose, what you tried, and what you would do with more time
(e) a demo you create
(f) a representation of historical information that you create
(g) classroom worksheet that you create as you research and report back on classroom standards related to linear algebra
(h) the beginnings of a more extensive research project...there are lots of possibilities—I encourage creativity!

Sample topics

I encourage you to be creative and find a topic that relates to linear algebra and interests you! Here are some final project ideas, just to give you a sense of some possibilities! Because we have so many intended computer science majors, I have designated topics that could easily connect to cs via a *. **These are just a few of many possibilities! I am happy to help.**

- Anomaly detection and linear algebra *
- Applications of higher dimensional vector spaces to computer learning in order to diagnose heart disease, breast cancer, and use sonar signals to distinguish rocks from mines *
- Collision detection and linear algebra *
- Connections between linear algebra and calculus III, a physics, computer science, geology, or other class you have already taken, or with research experiences or your field *
- Covariance matrix and mean vector *
- Determinants and the eight queens problem *
- Eigenfaces *
- Electric circuits and linear algebra
- Fit points to a line or plane *
- Frustum culling and linear algebra *
- Genetics and linear algebra
- Gershgorin circle theorem and applications to flutter of an aircraft
- Golden mean and matrices
- Google and linear algebra *
- How Does the NFL use Linear Algebra to Rate the Passing Ability of Quarterbacks?
- History of a topic in linear algebra [like Gaussian elimination, linear transformations, vectors...]
- Hill cipher and eigenvalues
- Image alignment and linear algebra *
- Least squares regression *
- Markov chains and actuarial sciences
- Metric tensor and relativity
- Neural networks and linear algebra *
- Optimal sustainable harvesting and linear algebra
- Orthogonal matrices and Gram Schmidt *
- Point on which side of line, plane, hyperplane? *
- Principal component analysis and linear algebra in machine learning or image processing *
- A proof we did not cover in class, like "Any orthogonal set of n nonzero vectors in $\mathbb{R}^n$ must be a basis for $\mathbb{R}^n$"
- A part of the book we did not cover in class, like Cramer's rule *
- Quantum mechanics and eigenvalues
- Recommendation engines and linear algebra *
- Rotation matrices, gimbal lock, and the space shuttle
- Singular value decomposition in image compression *
- Visualization and linear algebra *

Peer reviews

To make connections you will conduct **four** peer reviews. If possible, select people who choose a different topic than you did.

1. Name of the person
2. List the project title
3. List the topics from class that relate
4. List one or more strengths of the project
5. Give one or more suggestions for the project
6. How much time and effort does it look like they put into their work, as compared to your own effort? [2 = more than me, 1 = about the same as me, 0 = less than me]
7. What did you learn?
8. What is your favorite part of their project?

Self-evaluation

Use these questions to guide your self-evaluation

1. Your name and topic
2. What would you have improved about your project with more time and/or resources?
3. What did you feel went well?
4. If you worked alone, discuss what you learned about yourself through this project. If you worked with a partner discuss how you worked together or divided up the work. Do you deserve the same grade as your partner? Why or why not?

Resources

You have many options to record your video response.

1. You can use your Screencast-o-matic pro account http://screencast-o-matic.com/appstate. The video found at https://youtu.be/K3wqlKDnWv0 gives a quick introduction to using Screencast-o-matic to record and share your work. This video reviews the free version while highlighting many great features available with a *deluxe upgrade*. You already have the *deluxe upgrade* when you sign in with your appstate credentials at http://screencast-o-matic.com/appstate. This means you have access to all of the features that are advertised in the video!

2. You can use Kaltura within ASULearn. See https://confluence.appstate.edu/display/public/ATKB/Kaltura+in+AsULearn. In fact, Zoom cloud recordings are automatically copied to your private Kaltura My Media directory, so you can also use your Zoom pro account https://appstate.zoom.us/.

3. You could create a recording with your phone or some other recording software (Quicktime, for example, if you have a Mac) and then use YouTube or Google Drive to host and share your work. Review https://youtu.be/9dLI0O2DeTo to see a quick introduction to sharing your work on YouTube. You can read detailed instructions about how to share your video file on Google Drive at https://www.businessinsider.com/how-to-share-a-video-on-google-drive. I think using the share link option (step 6) with permissions set to "anyone at appstate" is the easiest way to share.