

**An Introduction to CS 491** 1

"What will matter is what you learned and how you used it." -- poster outside my office



**Oregon State University**

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**Mike Bailey** 2

- Professor of Computer Science, Oregon State University
- Has been in computer graphics for over 30 years
- Has had over 10,000 students in his university classes
- mjb@cs.oregonstate.edu



Welcome! I'm happy to be here. I hope you are too!



Kelley Engineering Center at Oregon State University, home of CS



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**I Apologize in Advance for What Noise You Might Hear in the Background ☺** 3







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**Concerns Taken from our Mid-summer Qualtrics Survey** 4

**You're concerned that the course is too difficult**  
Hard to quantify what is "too difficult", but hundreds of previous students have succeeded in it.

**You're concerned about the math level**  
We will use algebra, trigonometry, and (a tiny bit of) calculus



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## The CS 491 Resources Page

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Class materials will be linked into various Canvas pages,  
but you can find *everything* here:

<http://cs.oregonstate.edu/~mjb/cs491>



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## The Premise Behind our CS 491 Topics:

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1. In any simulation or game, a certain number of actions must be produced.
2. Producing them by hand is *hard*.
3. And oftentimes they don't look very good that way anyway.
4. Producing them using computer programming, mathematics, physics, and algorithms makes the task easier and faster to achieve.
5. Also, this allows you to adjust parameters to get them *exactly* the way you want.
6. And it usually ends up looking better.



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## Course Topics

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### CS 491 topics include:

1. Parametric lines
2. Vectors: dot product, cross product, uses for dot and cross products
3. Matrices: definition, multiplication, transpose, determinant, inverse
4. GLM C++ vector and matrix classes and methods
5. 3D coordinate systems, transformations
6. Forward kinematics (hierarchical transformations)
7. Newton's method for solving for roots of nonlinear equations
8. Inverse kinematics using Cyclic Descent
9. Rigid-body constant-acceleration kinematics, projectiles
10. Rigid-body dynamics, integrating equations of motion
11. Keyframe animation
12. Functional Animation (Collision avoidance)
13. Collisions, impulse-momentum, rebounding
14. Particle systems
15. Modeling the world as a mesh of springs (e.g., chains, strings, cloth, jello)
16. Guest Lectures



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## Grading: Points and Cutoffs

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- There will be 10 quizzes, 2 tests, and 7 programming projects

**Total Points = 940**

Grade cutoffs will be no higher than:

Points	Grade
910	A
890	A-
870	B+
850	B
830	B-
810	C+
790	C
770	C-
750	D+
730	D
710	D-

Note that this is not a 90-80-70-60 scale! I use this scale because I do a soft grade on the programming projects.



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## Quizzes

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- Quizzes will go live on Canvas every Friday at 12:01 AM Pacific Time.
- Each quiz is due at 23:59 Pacific Time Sunday evening.
- Exception: Quiz #0 is due at 4:00 PM Friday, September 30
- There is *no quiz* on the Friday of Thanksgiving weekend (Week #9).
- Part of what is being quizzed is the time management skill to remember to take the quizzes. Thus, if you forget to take the quiz, there is no make-up.
- I *really* recommend that you take the quiz *before the end of Friday!* That way, all your weekend activities won't distract you from getting your quiz grade.



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## EECS Information for You:

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### Calendar of Events:

(EECS events are in orange, career events for students are in green )

<https://eeecs.oregonstate.edu/eeecs-calendar>

### Resources for students looking for internships and jobs:

<https://eeecs.oregonstate.edu/eeecs-student-portal>



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## More Information, I:

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### Link to the Code of Student Conduct:

<https://beav.es/codeofconduct>



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## More Information, II:

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### Students With Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

### Religious Holidays

Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.



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**Life Events**

As {John Lennon? Allen Saunders?} has said: "Life is what happens to you while you're busy making other plans". I care about you as a person. When life happens to you, send me an email and come see me. I might be able to help, I might not. But I surely can listen. You are not alone.

**Reach Out for Success**

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with me or an academic advisor. Learn about resources that assist with wellness and academic success at <http://oregonstate.edu/ReachOut>. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255) .

**Basic Needs**

Success at OSU means knowing and using your resources. One helpful resource is the community of staff available at the Basic Needs Center (BNC) for support ([bnc@oregonstate.edu](mailto:bnc@oregonstate.edu), 541-737-3747). Students can drop in during open hours and talk with a BNC student leader for resources, ideas and strategies connected to basic needs challenges. The BNC is often known for its [food pantry](#) but there are other resources connected to groceries and affording food often available and staff who can help you work through housing stressors. Undergraduate students, living in Oregon, are especially encouraged to explore SNAP (up to \$236 in grocery money each month for eligible students) as a resource. Domestic undergraduate students living in Oregon are more likely than not to be eligible for SNAP. BNC staff are skilled with helping students navigate this process.

Additionally, the BNC [Textbook Lending Program](#) offers students the opportunity to check out required textbooks for the academic term.

Furthermore, if you are comfortable doing so, please talk with Professor Bailey. He will do everything he can to help you.

