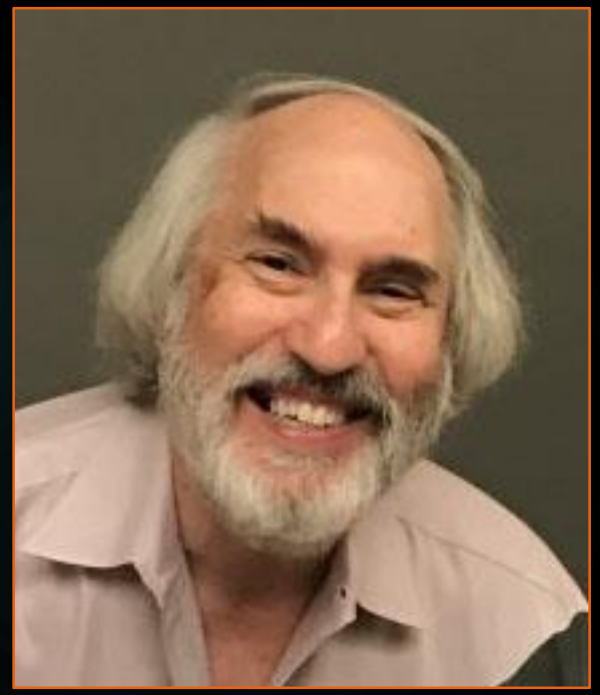
January 4, 2022

Course Overview & Introduction to Assistive Technology

ENGR110/210
Perspectives in Assistive Technology



David L. Jaffe, MS

Instructor

16

Years

So Much Fun!



















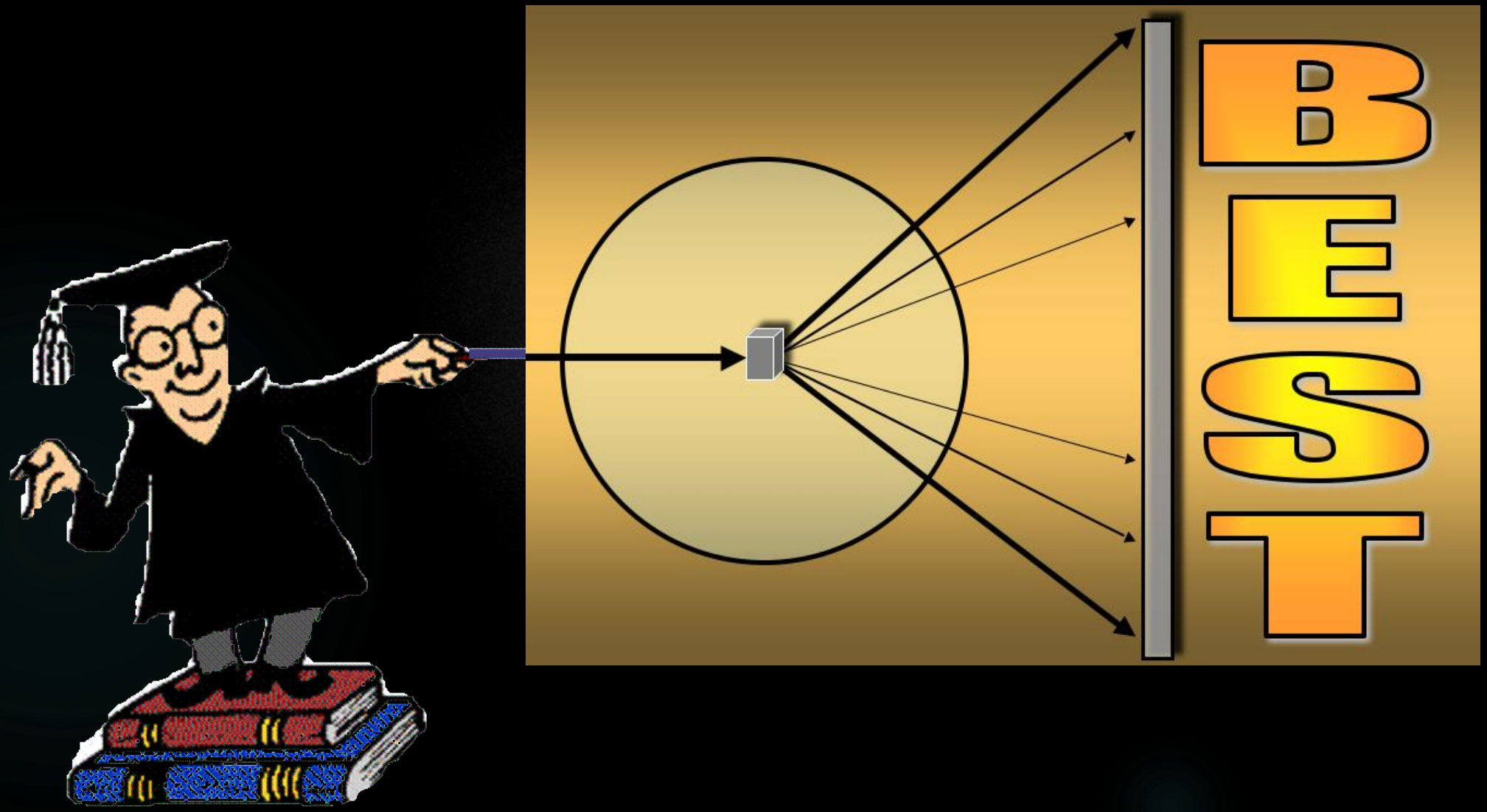

Homage to Prof Kane

"Have I made a good choice by enrolling in *Perspectives in Assistive Technology?*"

- First day of class
- New course
- New instructor
- Unfamiliar subject

“Have I made a good choice by enrolling in *Perspectives in Assistive Technology?*”

This is the best course I teach

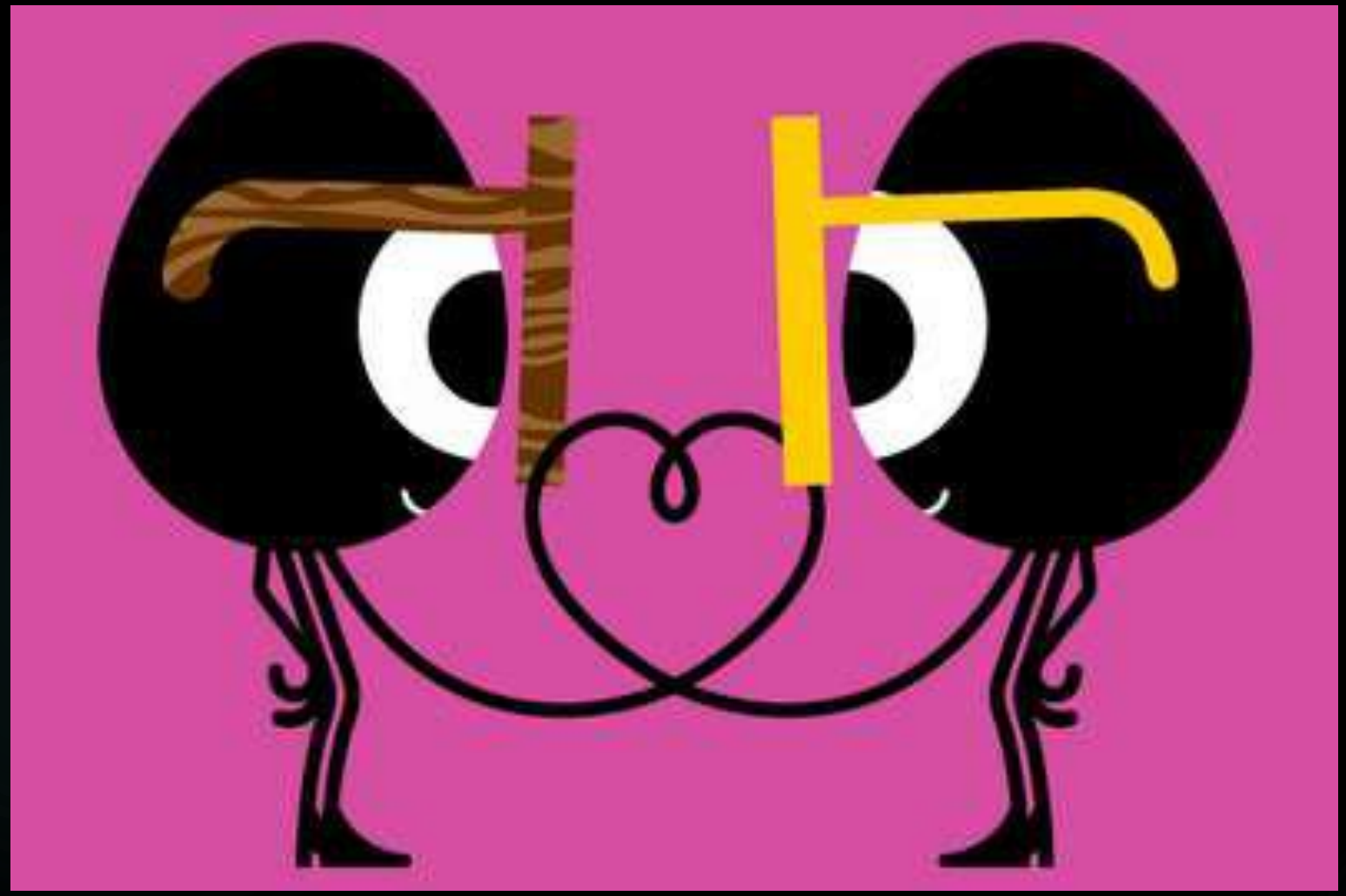


This is the best assistive technology course at Stanford

Everyone who has taken this course has earned a very good grade

Not everyone gets an “A”

Meet your love connection



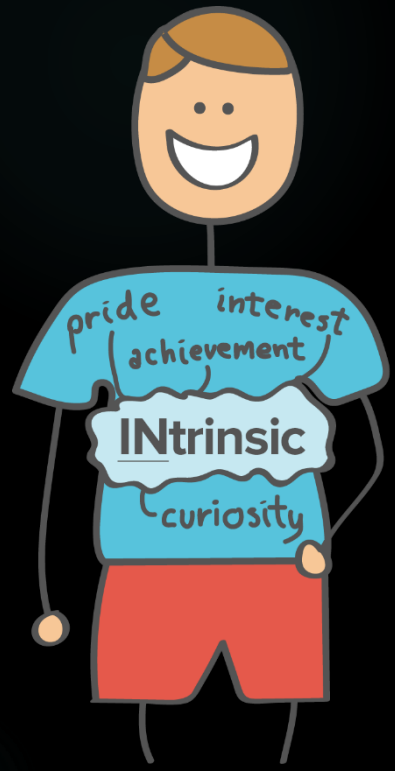
The fame and notoriety

You are compelled to do it

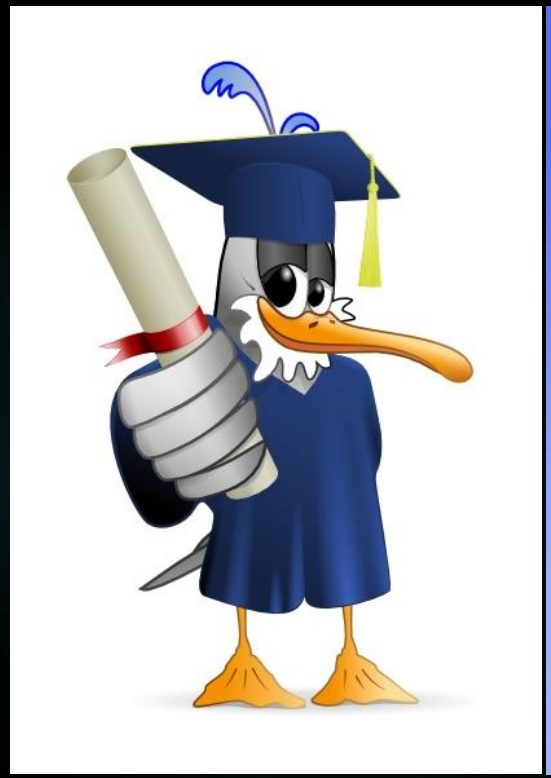
"Top motivational factors for engineering students are behavioral, psychological, social good, and financial."
Center for the Advancement of Engineering Education

Service Learning

Local Community



You want to know if your Stanford education and skills can benefit others



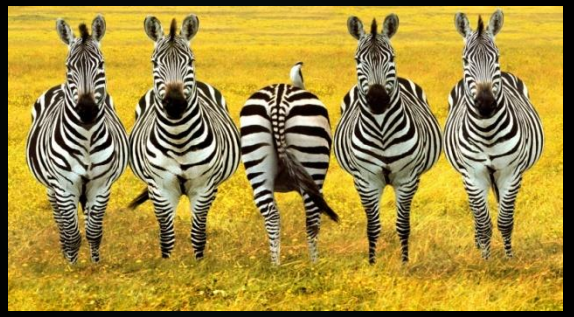
Factors recent graduates rate most important in choosing their first job

1. Opportunity for advancement
2. Opportunity to benefit society
3. Salary
4. Hours required
5. Travel time to / from work
6. Health benefits
7. Vacation time
8. Bonuses
9. 401(k) matching
10. Relocation opportunity
11. Tuition reimbursement
12. Pension plan
13. Stock options

The job opportunities

You have heard good things about the course

You want to take something completely different



Call Me "Dave"

"Professor" from Gilligan's Island

Dr. David Zorba (Sam Jaffe)
from Ben Casey

Mr. Jaffe, my father

David A. Jaffe

David M. Jaffe

My title is not Professor and I don't have a PhD or MD

David L. Jaffe, MS
Course Lecturer

"Partly Sunny"

Rabbi David Jaffe

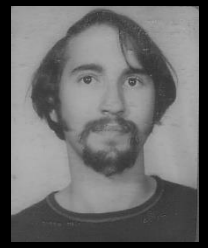
More about Me

Go Blue!

Go Cats!

Go Cardinal!

- Education:
  - University of Michigan - BS in EE
  - Northwestern University - MS in BME
- Employment:
  - Hines VA Hospital
  - VA Palo Alto Health Care System - RR&D
- Stanford:
  - ME170, ME218, ME294, ME310, BioE141, assistive technology projects



At 22

Hines VA Hospital

VA Palo Alto RR&D

VA Palo Alto

My Passions

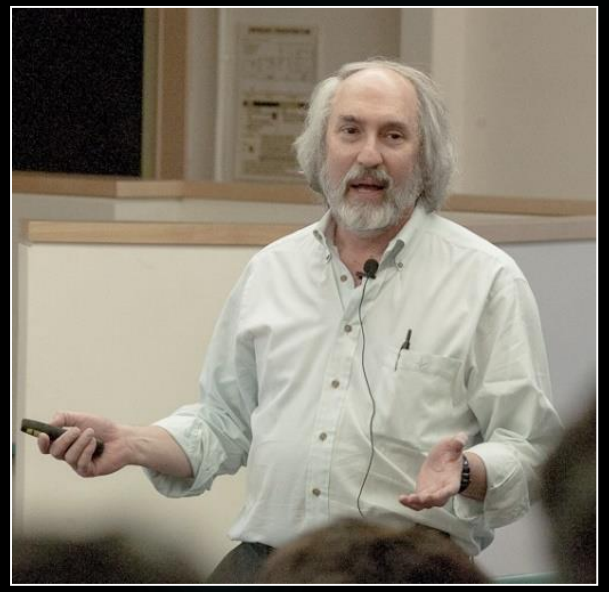
Don Herbert

- Inspired by “Watch Mr Wizard”
- Early home computer adopter - 1975
- Forth programming language devotee, embedded systems
- Teaching human aspects of technology and engineering

My computer - 1978

FORTH INTEREST GROUP

fig



Five numbers that define me

1. 11/11/1979 - arrived in California
2. 15 - years teaching the course
3. 4.6 / 5.0 - 2019 course evaluation score
4. 43 - number of students enrolled last year
5. 957 - number of cookies served in course in 2020

My Biases and Thinking

- Engineering
- Fabricating & testing functional prototypes for/with real users
- Using quantifiable terms

“There is no objective way to classify degrees of goodness.“
Dr. Sheldon Cooper, Cal Tech Theoretical Physicist and Nobel Laureate

Course Organizer & Instructor

Course Assistant - Bennett Lewis

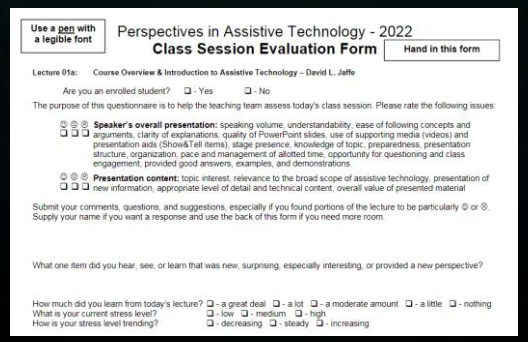
Bennett is currently pursuing a Coterminal Master's in Mechanical Engineering, with a concentration in Manufacturing and Product Realization. He recently completed his Bachelor's in Biomechanical Engineering, and he is passionate about the intersection between design, engineering, and anatomy. These interests have translated into his professional experience, which includes projects on human factors and human-centered design principles. Outside of school, Bennett can be found cooking, taking photos, working in coffee shops, and spending time with friends.

Today's Agenda

- Welcome to the Course
- Course description
- Introduction to Assistive Technology
  - What is Assistive Technology?
    Definition
    Population numbers
  - Assistive Technology research and devices:
    DJ projects at VA
    Existing devices and products
    New technology
- Student Project Preview
  - Project Suggestions for this Quarter
  - Last Year's Student Projects
- Class Sessions Preview
  - Lecture Schedule for this Quarter

to the Class

- Welcome students and community
- Administrative items:
  - Student sign-up sheet
  - Sign in every class session:
    - Enrolled students - attendance
    - Community members



Use a pen with a legible font

Perspectives in Assistive Technology - 2022
Class Session Evaluation Form

Hand in this form

Lecture 01a: Course Overview & Introduction to Assistive Technology – David L. Jaffe

Are you an enrolled student? ❑ - Yes ❑ - No

The purpose of this questionnaire is to help the teaching team assess today's class session. Please rate the following issues:

☹ 😐 ☺
❑ ❑ ❑ **Speaker's overall presentation:** speaking volume, understandability, ease of following concepts and arguments, clarity of explanations, quality of PowerPoint slides, use of supporting media (videos) and presentation aids (Show&Tell items), stage presence, knowledge of topic, preparedness, presentation structure, organization, pace and management of allotted time, opportunity for questioning and class engagement, provided good answers, examples, and demonstrations

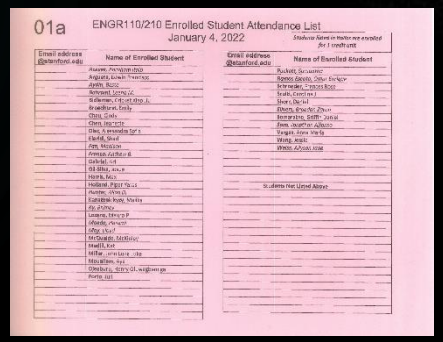
☹ 😐 ☺
❑ ❑ ❑ **Presentation content:** topic interest, relevance to the broad scope of assistive technology, presentation of new information, appropriate level of detail and technical content, overall value of presented material

Submit your comments, questions, and suggestions, especially if you found portions of the lecture to be particularly ☹ or ☺. Supply your name if you want a response and use the back of this form if you need more room.

What one item did you hear, see, or learn that was new, surprising, especially interesting, or provided a new perspective?

How much did you learn from today's lecture? ❑ - a great deal ❑ - a lot ❑ - a moderate amount ❑ - a little ❑ - nothing
What is your current stress level? ❑ - low ❑ - medium ❑ - high
How is your stress level trending? ❑ - decreasing ❑ - steady ❑ - increasing

Class Session Evaluation Form

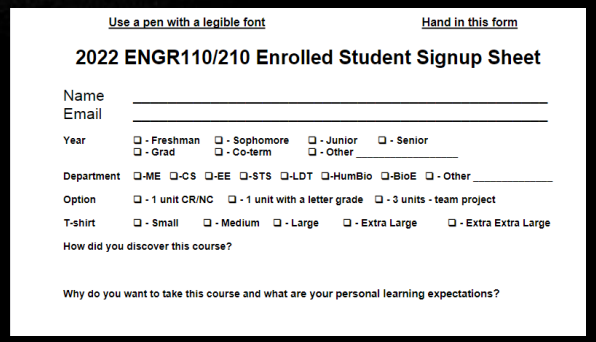


01a ENGR110/210 Enrolled Student Attendance List
January 4, 2022

Email address @stanford.edu | Name of Enrolled Student

Students Not Listed Above

Attendance List



Use a pen with a legible font | Hand in this form

2022 ENGR110/210 Enrolled Student Signup Sheet

Name _____
Email _____

Year ❑ - Freshman ❑ - Sophomore ❑ - Junior ❑ - Senior ❑ - Grad ❑ - Co-term ❑ - Other _____

Department ❑-ME ❑-CS ❑-EE ❑-STS ❑-LDT ❑-HumBio ❑-BioE ❑ - Other _____

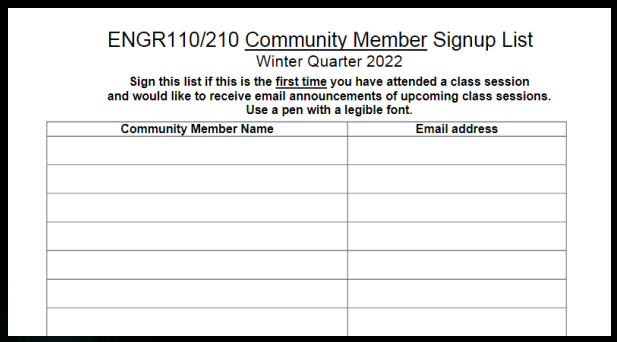
Option ❑ - 1 unit CR/NC ❑ - 1 unit with a letter grade ❑ - 3 units - team project

T-shirt ❑ - Small ❑ - Medium ❑ - Large ❑ - Extra Large ❑ - Extra Extra Large

How did you discover this course?

Why do you want to take this course and what are your personal learning expectations?

Enrolled Student Signup Sheet



ENGR110/210 Community Member Signup List
Winter Quarter 2022

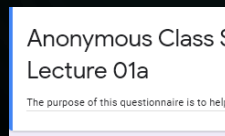
Sign this list if this is the first time you have attended a class session and would like to receive email announcements of upcoming class sessions. Use a pen with a legible font.

Community Member Name	Email address

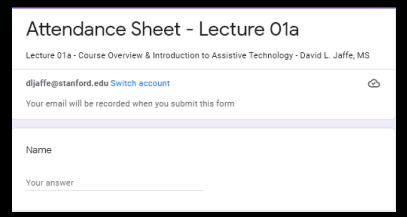
Community Member Signup List

to the Class

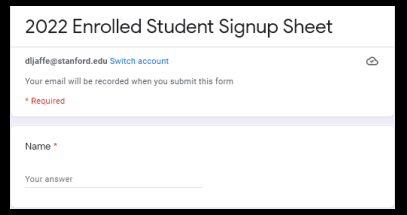
- Welcome students and community
- Administrative items:
  - Student sign-up sheet
  - Sign in every class session:
    - Enrolled students - attendance
    - Community members



Class Session Evaluation Form



Attendance List



Enrolled Student Signup Sheet

Community Member Signup List

Who are these students and why are they smiling?

Class Genesis

- How this course came about
- Why is it being offered

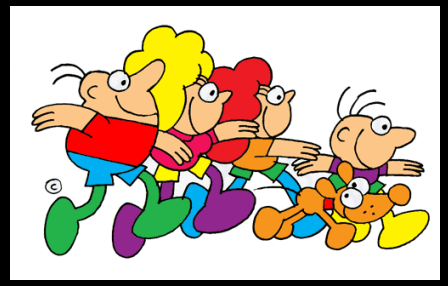
Star Trek Genesis Project

The Genesis Planet

The Genesis Device

The Rock Group Genesis

Course Objectives



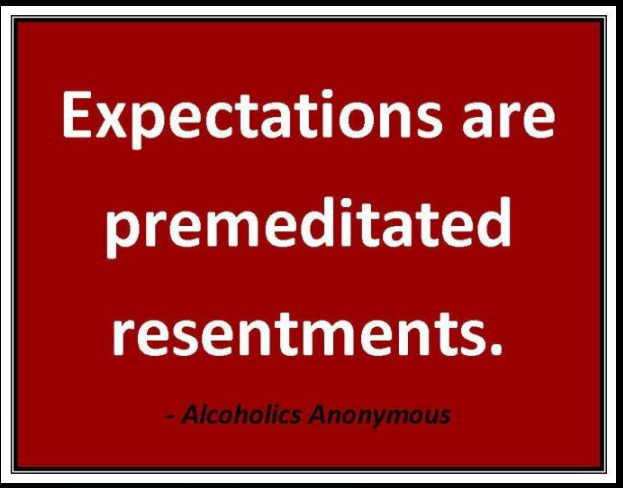
- Gain additional engineering confidence in applying your knowledge and skills to address real problems in the world.
- Focus on critical thinking and communication skills, working as a team, and interacting with individuals in the local community
- Learn about the design, development, and use of technology that benefits people with disabilities and older adults
- Practice leadership & organization

Skills Exercised

- Independent & critical thinking
- Analysis
- Problem-solving
- Working in a team
- Working in the community
- Public service
- Service-learning
- Designing, fabricating, testing, analyzing, iterating
- Communicating: reports, presentations, class participation
- Leadership & Organization

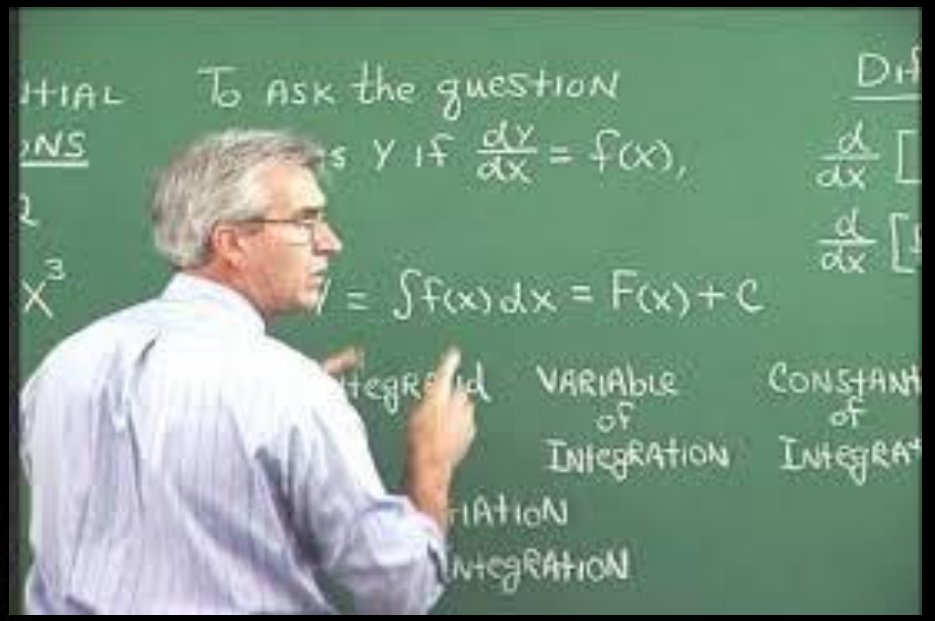
What kind of course are you expecting?

- Love to study; do homework and problem sets; take quizzes, exams, and finals?
- Relish going through an expensive course textbook chapter by chapter?
- Anticipate hearing the professor's voice for the entire quarter?
- Excited about learning something without an obvious practical application or that you will just forget next quarter?
- Want to further improve your ability to study and take exams?
- Enjoy taking notes and smelling a highlighter?



Are These Your Expectations?

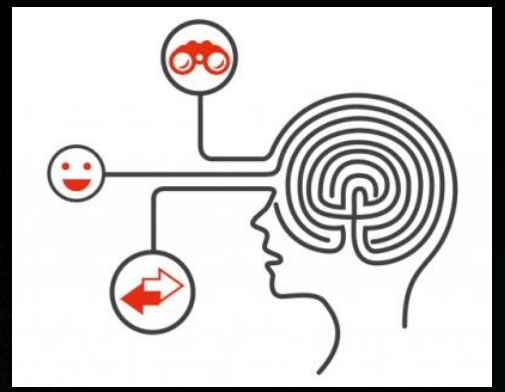
- Equations, derivations, proofs
- Chapter-by-chapter
- Disability-by-disability
- Device-by-device



$$e^{i\pi} = -1$$

The only equation you may see

What this Course isn't

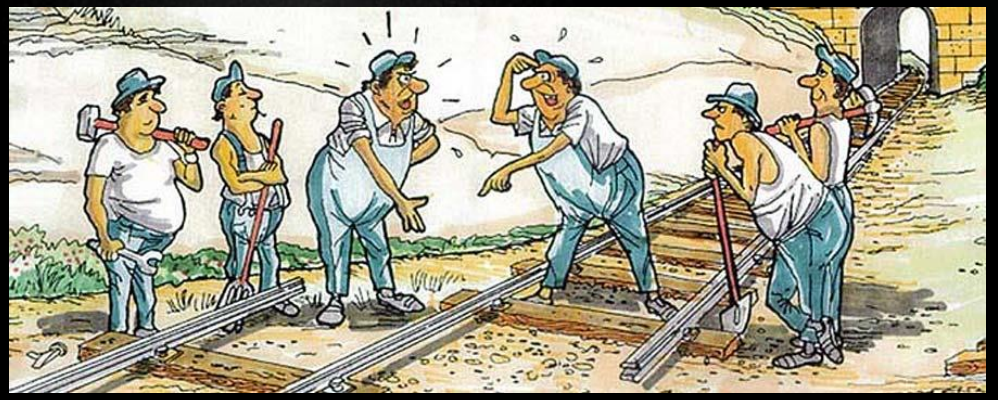


- Not a d.school course
- Not a course in Design Thinking or Product Design
- Not just about good ideas and using Post-it notes
- Not about starting a company
- Not about commercializing a device or product
- Not about business or marketing or manufacturing
- Projects typically not with big companies or in foreign countries
- No finals, exams, problem sets, or quizzes
- No books to buy
- Some weekend reading
- No boring lectures

"Not that there is anything wrong with that"

What this Course is

- Technology and people
- Assistive Technology in its many forms
- Engineering design-development process:
  - Understanding the problem
  - Brainstorming
  - Prototyping, testing
  - Refining, iterating
  - Communicating



- Working on a project
- Partnering with local community
- Previewing your professional life

Course Credentials

- Certified Service Learning Course [Cardinal Course] (Haas Center for Public Service)
- Approved course for ME undergraduate degree (*Handbook for Undergraduate Engineering Programs 2010-2011, page 308, note 7*)
- Can be approved as an elective for the MS degree in ME by a faculty advisor
- Approved for the Program in Science, Technology & Society (STS) - included on the BS Major STS Core list in Social Scientific Perspectives area of the Disciplinary Analyses section
- Approved for HumBio Program and Symbolic Systems
- Approved for Learning, Design and Technology (LDT) in the Graduate School of Education
- Listed as one of two "Save the World" Winter Quarter courses on *The Unofficial Stanford Blog*

STANFORD ENGINEERING

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THE UNOFFICIAL STANFORD BLOG

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« Pasadena-Bound? A Government We Deserve? The Meaning of Tuesday's Elections »

TUSB 2011 Winter Course Guide: spice up your courseload!

Stanford: land of sunshine-y studying all year round

It's that time of year again! Not sure what winter classes to take? No worries; check out TUSB's course primer. Whether you're looking to satisfy a GER, find profound inspiration, or just take a fun class for **kicks**, we've got you covered.

If there's anything we missed, don't hesitate to mention it in the comments – we appreciate your feedback. Additionally, you can check out past years' course guides **here**. **Enjoy**!

Shake Your Groove Thing: what better way to **shake off** the winter doldrums (literally) than with some fun dance classes? Here's a small sampling of the Dance Department's awesome offerings.

- **EESS 105**: **Food and Community for a Sustainable Future** – from garden development to food dispersal to the needy
- **ENGR 110**: **Perspectives in Assistive Technology** – team-based projects for the disabled

Welcome to the Farm

Burst the Bubble: field trip-based

search | Search

The Unofficial Stanford Blog | Like 730

announcements:

The Procrastination Nation photo contest is over! Watch for the post with the winning entries.

popular this week

- Big Game Tickets Available
- A time to be thankful...
- Overheard at Stanford...

a word from our sponsors

recent comments

- C.J. on This Week in Stanford 11/7/10-11/13/10

"How wonderful it is that nobody wait a single moment before starting to improve the world." - Anne Frank

"Save the World"?
- or -
"Change the World"?

How many people do you have to save?

Course Structure

- A twice-weekly in-person in-classroom sessions exploring perspectives in the design and use of assistive technology by engineers, designers, entrepreneurs, clinicians, and persons with disabilities - a field trip, and a assistive technology faire.

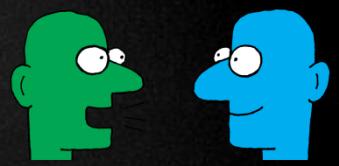
- Opportunities for thought, reflection, and discussion

- A project experience that includes problem identification, understanding, brainstorming, design, fabrication, testing, and reporting - benefitting individuals in the local community

Student Experience

- Gain an appreciation for the social, medical, and technical challenges in developing assistive technologies
- Learn about assistive technology concepts, design strategies, ethical issues, and interaction of people with technology

For students working on a team project:



- Engage in a comprehensive project experience that includes working with real users of assistive technology to identify challenges, prototyping solutions, performing device testing, practicing iterative design, and communicating results
- Employ engineering and design skills to help people with disabilities and older adults increase their independence and improve their quality of life

Your Experience

How does this course fit into your life and education?

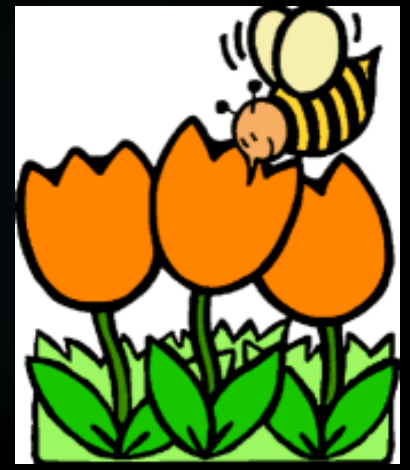
- not reliving past experiences
- not just another course
- previewing your future professional life

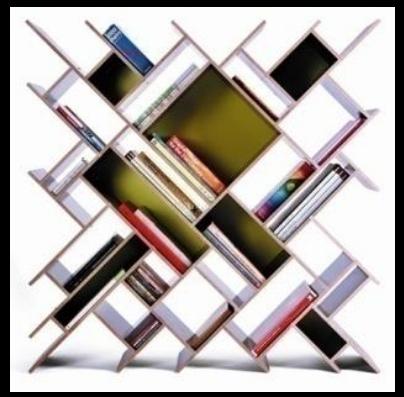
Credit Options

1-unit options:

- No letter grade (CR/NC)
  - Attend **at least 15** ENGR110/210 lectures (including this one)
  - No participation in a project

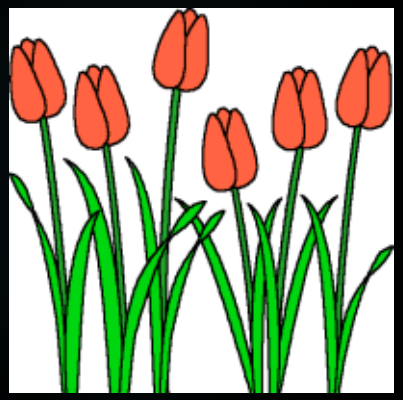
- Letter grade or CR/NC
  - Attend **at least 15** ENGR110/210 lectures (including this one)
  - Pursue a project: interview an individual with disabilities and
    - research an assistive technology topic,
    - paper design of an assistive technology device,
    - create of a work of art,
    - engage in an aftermarket aesthetic design, or
    - engage in an aftermarket functionality / usability design
    - consider a project from the Candidate Individual Project List
    - optionally work with another student during the "Understanding the Problem" activity



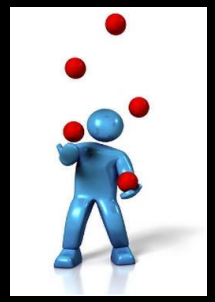


Other Options

- Optionally, continue with independent study (ME191 or ME391) effort in the Spring or Summer Quarter (with approval of your faculty advisor)

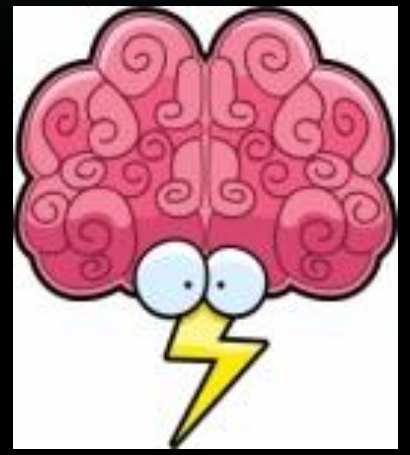


Project Activities

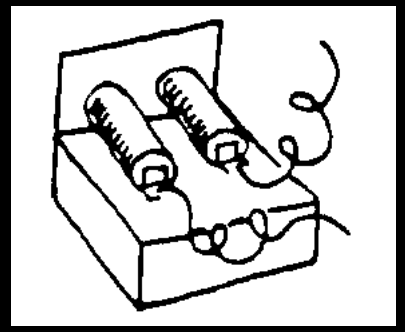


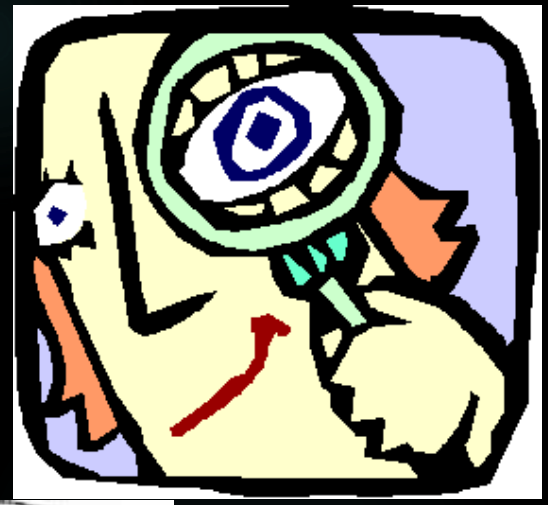
For those working on a project:

- Review candidate project descriptions & listen to team project pitches on Thursday
- Select a project & form a team
- Investigate project problem with an individual with a disability
- Evaluate the situation to further understand the problem
- Gather relevant background information for the project, including any prior design approaches and commercial products
- Brainstorm, evaluate, and choose a design concept
- Prototype, fabricate, test, analyze, and refine the design
- Present and demonstrate the design - giving background, criteria, initial concepts from brainstorming, selected design candidate, and any prototyping, fabrication, and testing
- Submit final report and reflect on experience

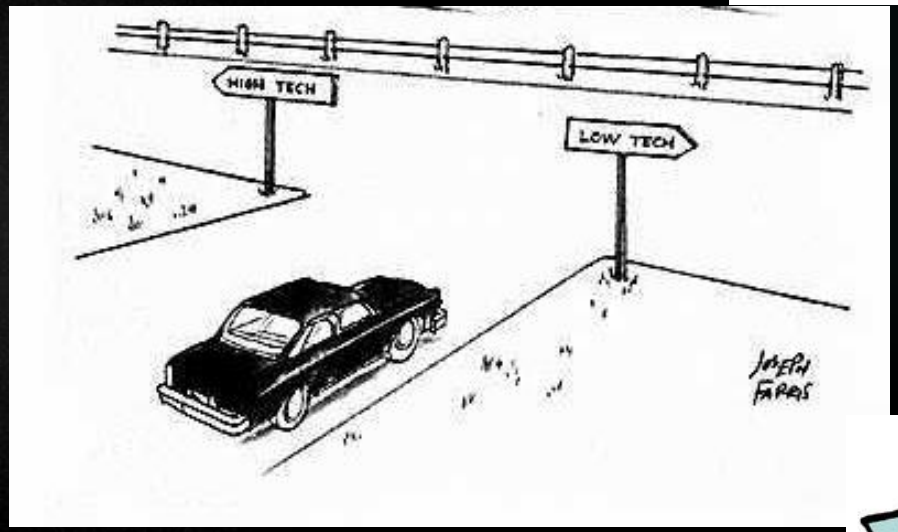


Projects



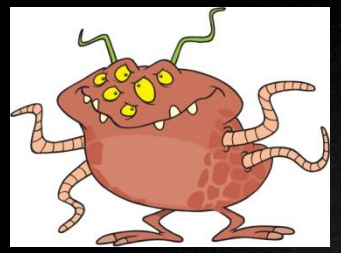


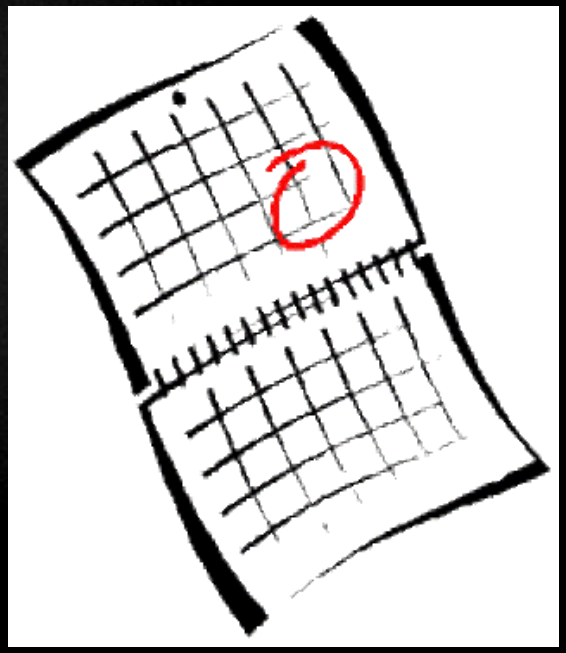
- "Building people" not projects - Prof Larry Leifer
- "Problem first" or "Technology first"
- 8-week prototypes
- Need not be ready-to-market
- Low tech solutions are ok
- Solution benefitting one person is ok
- Experiencing the design process and getting it to work are priorities



Your Project Team is Like a Company or Start-Up

- Team members
- Resources
- Deadlines
- Budget
- People to please / report to
- Problem to address
- Goal





Project Team Identification

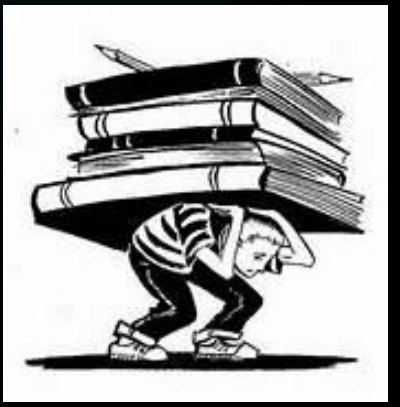
- Team name
- Team logo / icon
- Project name
- Device name
- Catch phrase

Why you may want to

If you have enrolled for three credit units, you may want to consider taking the course for one unit or waiting until next year if:

Take it twice!

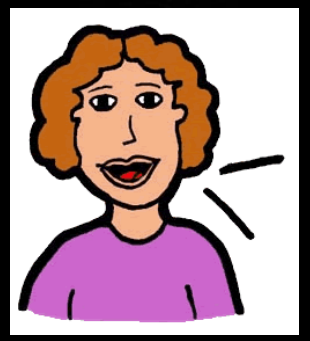
1. You are not graduating, or
2. If you have limited fabrication experience, or
3. If you are already taking a project course like ME112, ME170, ME203, ME210, ME218, ME310, BioE141, or …,
4. If you have to miss lectures, or
5. You are not able to devote at least 4 hours per week to your project.



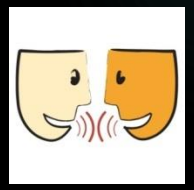
Assignments

For those working on a **team** project:

- Mid-term Presentation & Report
- Communicate team's project progress
- End-of-term Presentation & Report
- Reflect individually on your personal project experience

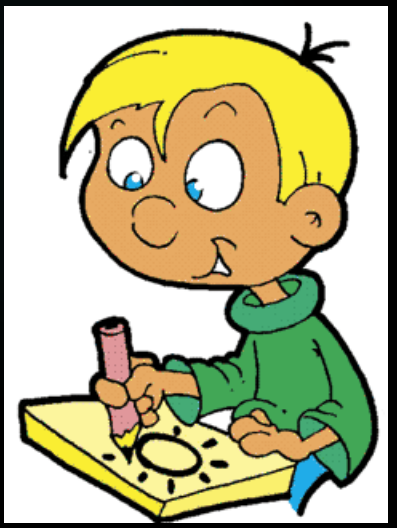


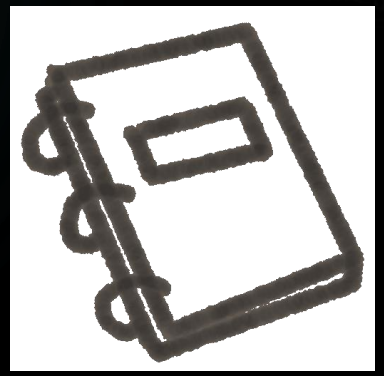
Assignments

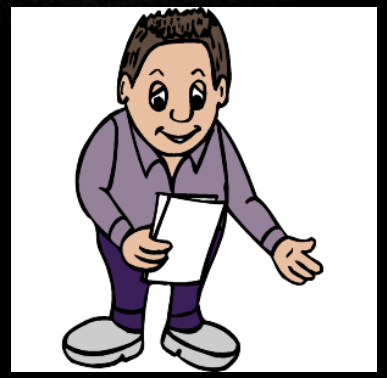


For those working on an **Individual** Project

- Meet with Dave to agree on a project
- Communicate your project progress **weekly**
- Individual Presentations & Mid-term and End-of-term Reports
- Reflect on your personal project experience





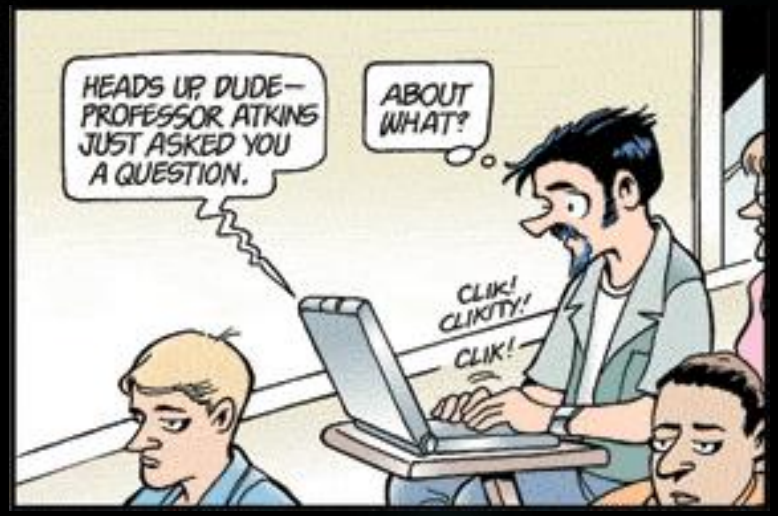


Grading

For those working on a team project:

- Mid-term Presentation 10%
- Mid-term Report 10%
- Prototype Design & Functionality 20%
- Final Presentation 20%
- Final Report 20%
- Individual Reflection 10%
- Participation 10%

Participation includes actively listening, posing questions to speakers, engaging in class discussions, verbalizing thoughts & analyses, and communicating project progress.



Grading

For those working on an individual project:

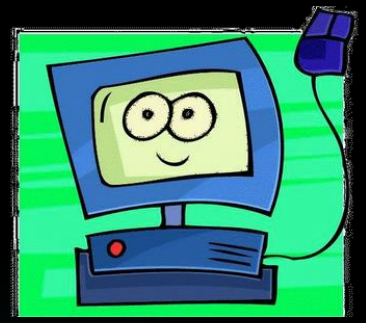
- Mid-term Presentation 10%
- Mid-term Report 10%
- Final Presentation 30%
- Final Report 30%
- Individual Reflection 10%
- Participation 10%

Participation includes actively listening, posing questions to speakers, engaging in class discussions, verbalizing thoughts & analyses, and communicating project progress.

Optional Follow-on Activities: Independent Study or SURI (ME)

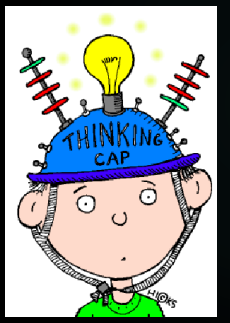
- Continue brainstorming additional design approaches
- Evaluate the approaches and select one to pursue
- Prepare an updated design proposal
- Perform detailed design and analysis
- Prepare a midway report
- Build a first cut prototype to demonstrate design feasibility
- Test the prototype and get feedback from users
- Redesign as necessary
- Construct a second, improved prototype
- Pursue re-testing and get feedback
- Prepare a final report documenting the results of a project and suggesting steps to further develop the design

Discussion Topics

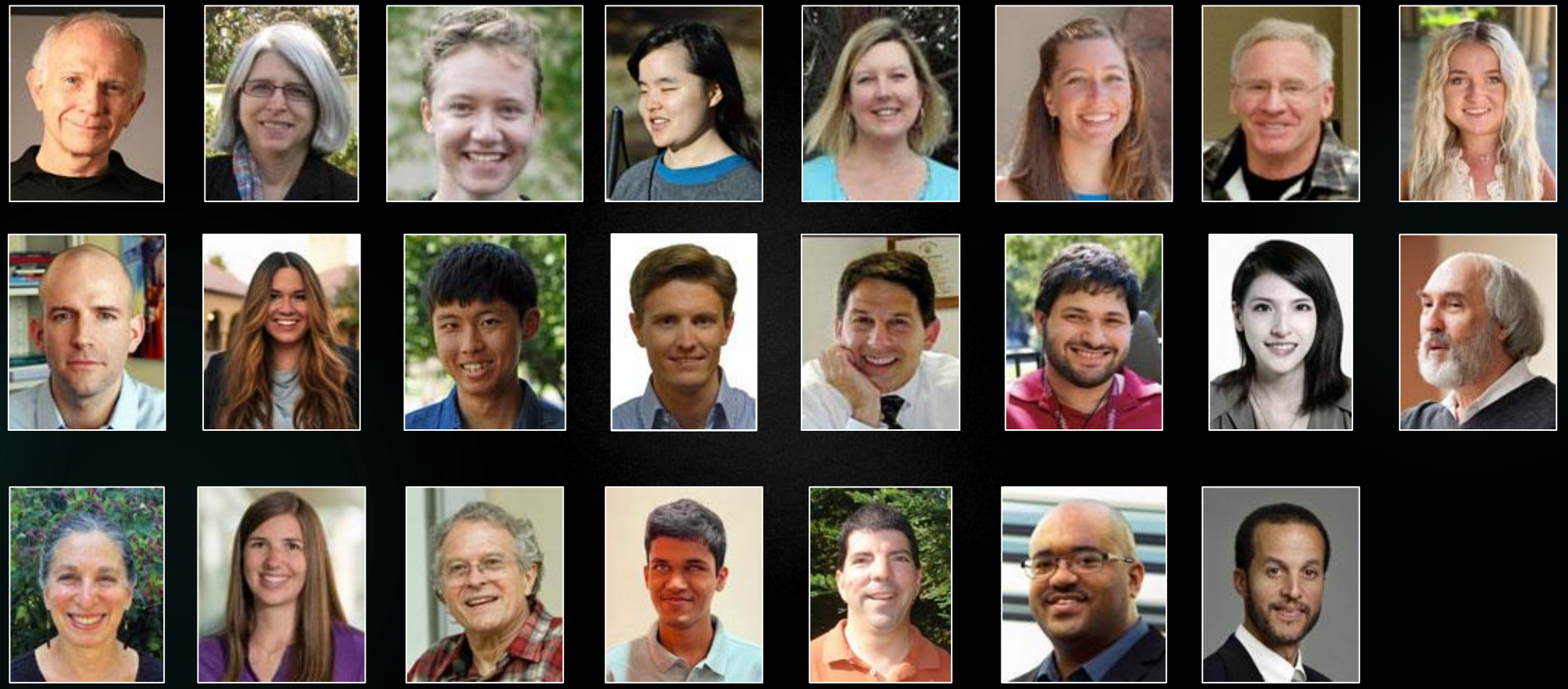


- Who is Disabled?
- The Upside of Failure!
- Antique technology
- New technology
- AT device review
- Famous people with disabilities
- Assistive robotics
- Student request

- Video theater
- Everything is a prototype / AT
- In the news
- What would MLK say about AT?
- Ableism, Ageism & Allyship
- Ethical dilemmas
- Marketing terms
- Accessibility
- Product costs



Guest Lecturers



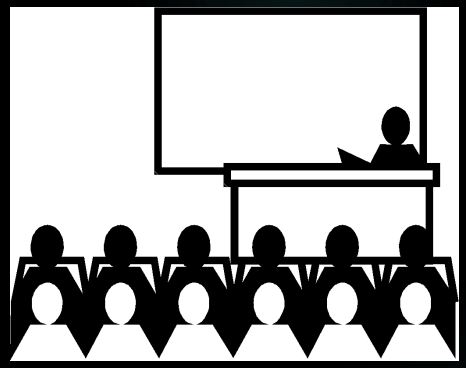
Project Suggestors



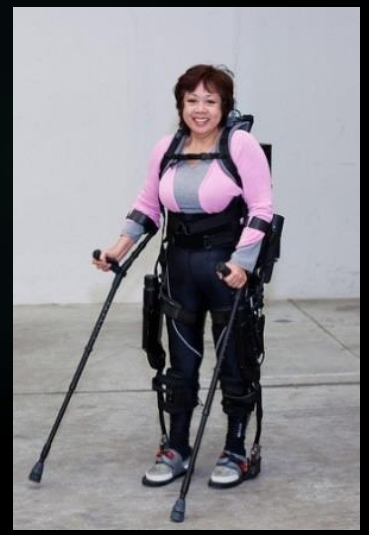




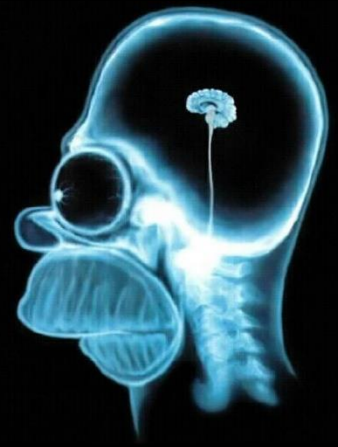

Lecture Titles 1 of 2

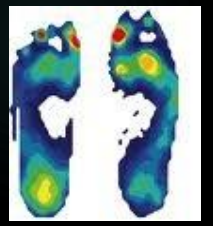


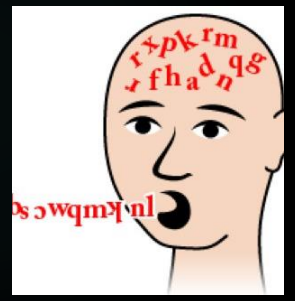
- Course Overview & Introduction to Assistive Technology
- Project Pitches & Team Formation
- Creating Assistive Technologies - Understanding the Problem
- Bridging the Gap between Consumers and Products in Rehabilitation Medicine
- Perspectives of Stanford Students and Faculty with a Disability
- From Idea to Market: Eatwell, Assistive Tableware for Persons with Cognitive Impairments
- Designing Beyond the Norm to Meet the Needs of All People
- Improving Home Environments for Older Adults
- Issues of Human Interface Design in Prosthetics
- Accessible Making: Designing Makerspaces for Accessibility



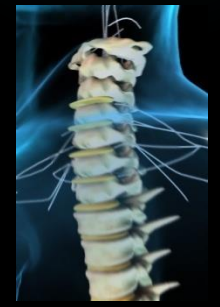
Lecture Titles 2 of 2







- Assistive Robotics
- VA Palo Alto Health Care System
- Field Trip to Magical Bridge Playground
- The Design and Control of Exoskeletons for Rehabilitation
- Designing Exoskeletons and Prosthetic Limbs that Enhance Human Performance
- Assistive Technology Faire
- Wheelchair Fabrication in Developing Countries
- Student Team Project End-of-term Presentations & Demonstrations



Lectures

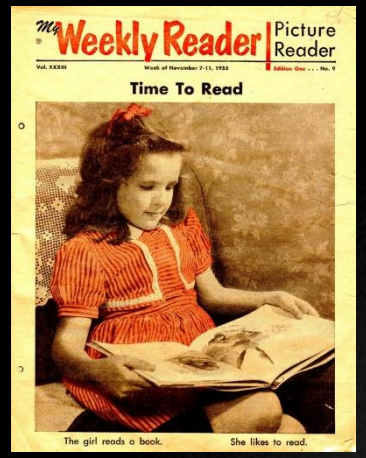
- Lecture topics are chosen for their interest, but may not relate to specific projects

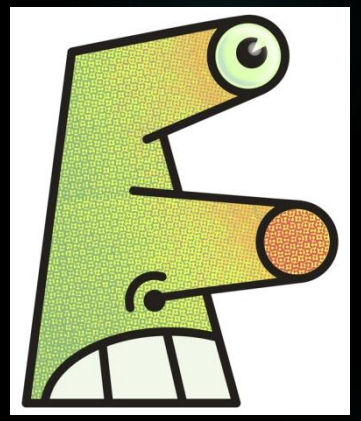
- Some class sessions may run overtime - students will be given an opportunity to leave at 5:30pm

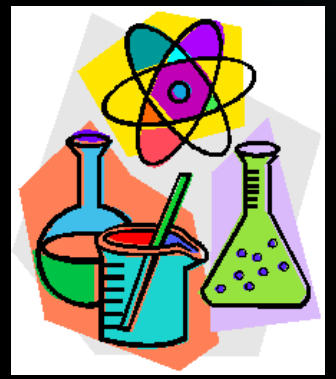
Technology Tidbits

Weekly Readings

- New products
- R&D
- Interesting articles





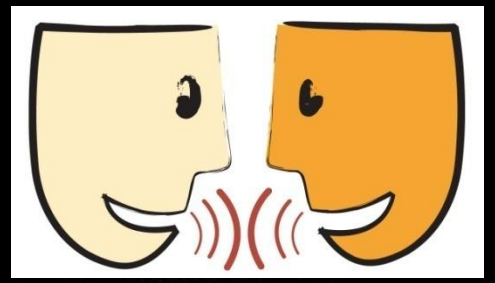


Tell Your Friends

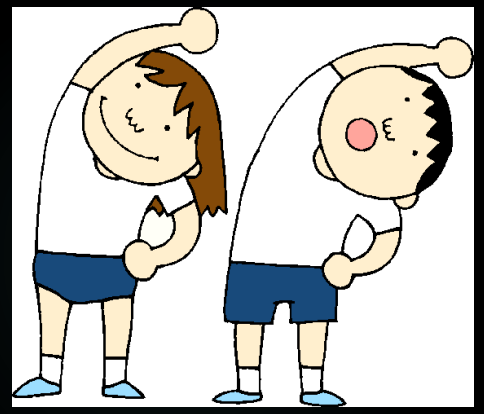
Openings for 1 credit unit options

Questions?

Break Activities



- Attendance sheet
- Stand up and stretch
- Take a bio-break
- Text message
- Web-surf
- Respond to email
- Talk with classmates
- Reflect on what was presented in class



Short Break