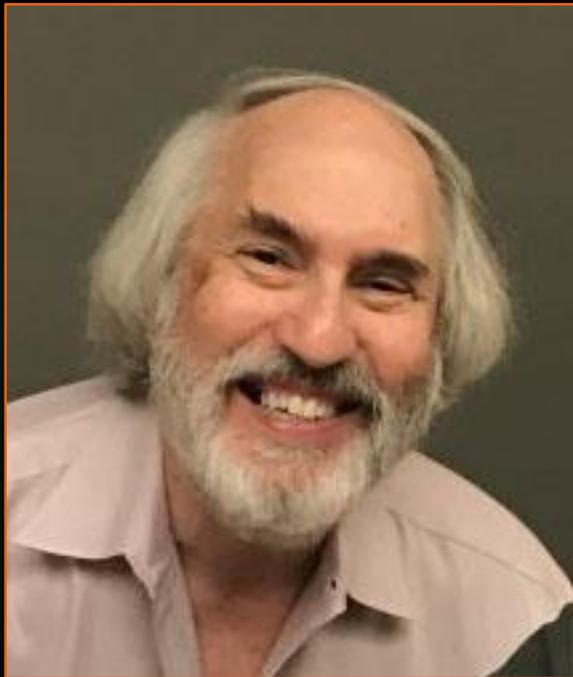


January 12, 2021
Course Overview & Introduction to Assistive Technology



ENGR110/210

Perspectives in Assistive Technology



David L. Jaffe, MS
Instructor

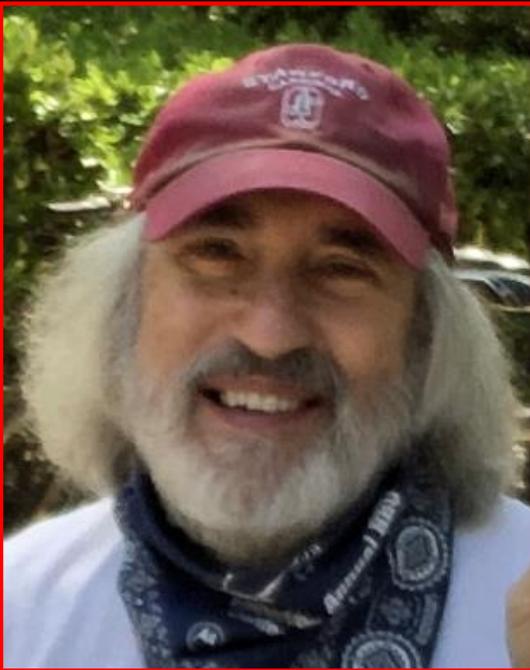
15
Years

January 12, 2021
Course Overview & Introduction to Assistive Technology



ENGR110/210

Perspectives in Assistive Technology

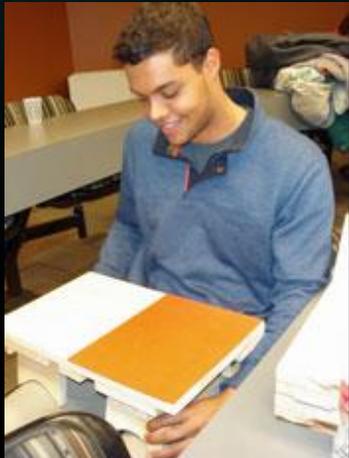


David L. Jaffe, MS
Instructor

Record

15
Years

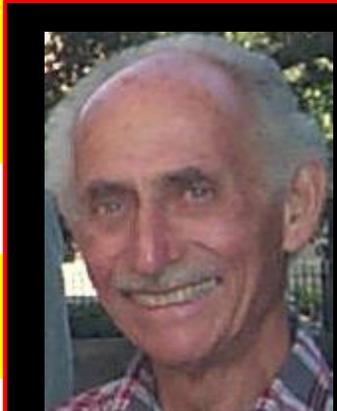
So Much Fun!



مجلس إدارة جمعية إيداع



Any questions so far?



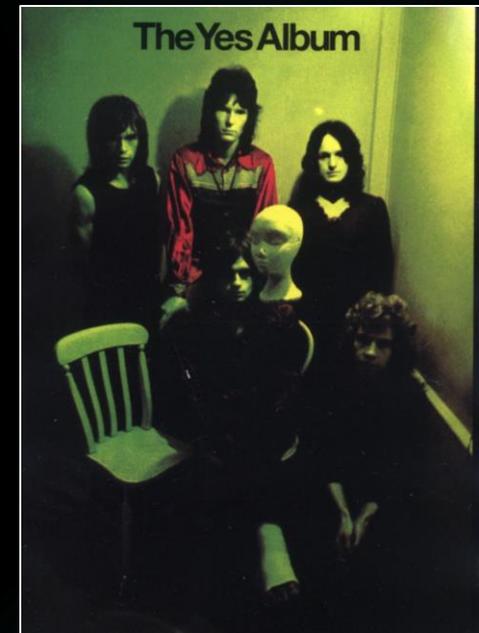
Homage to Prof Kane

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

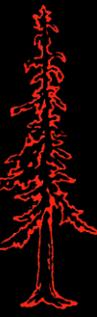
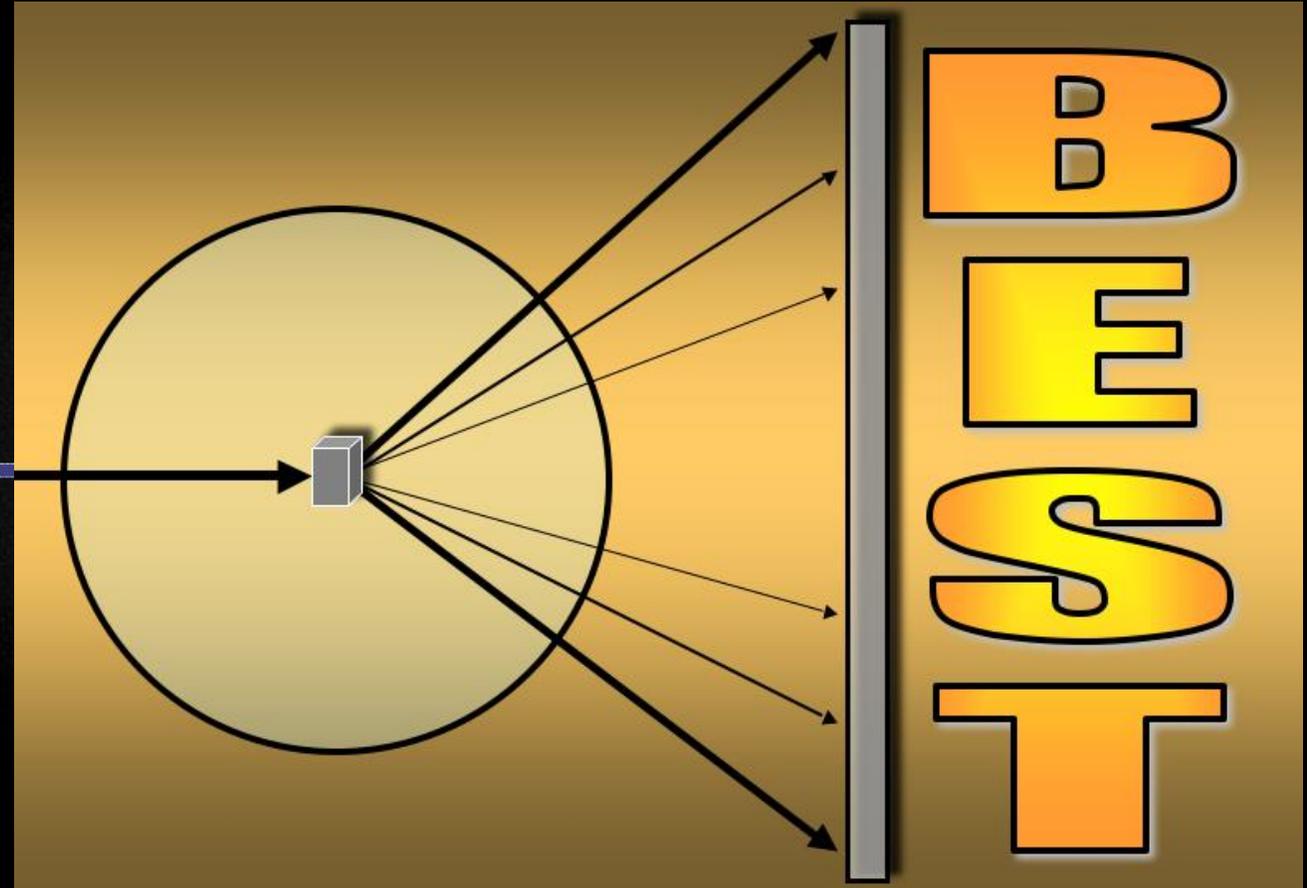


- First day of class
- New course
- New instructor
- Unfamiliar subject

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



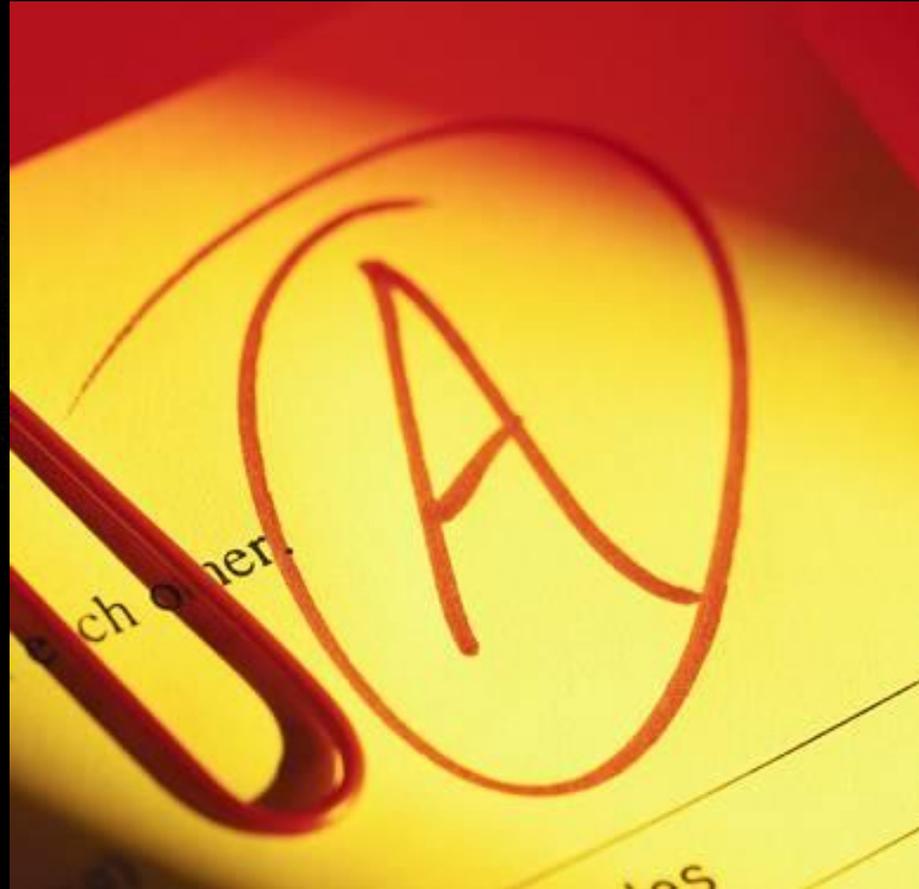
This is the best course I teach



This is the best assistive technology course at Stanford

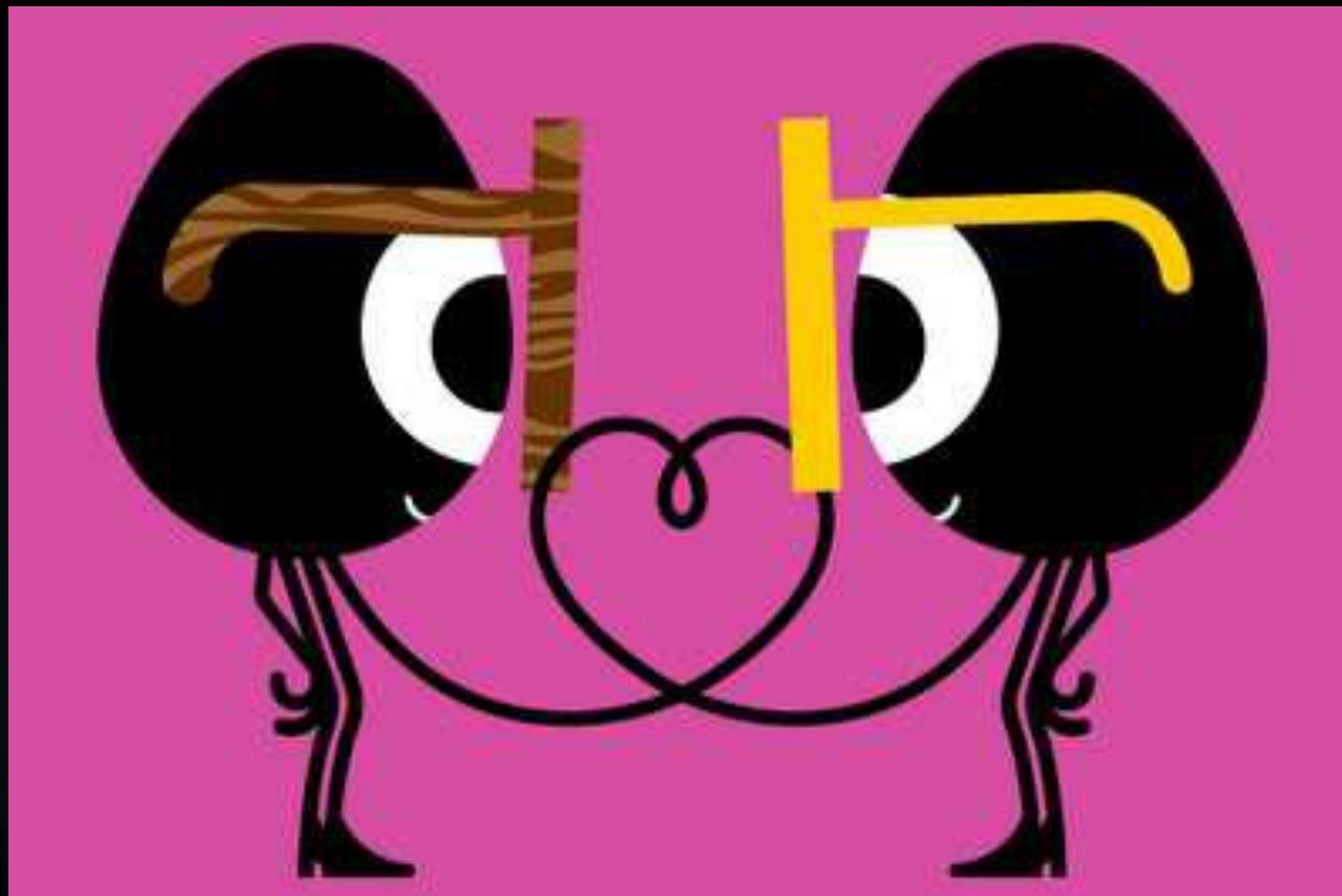


Everyone who has taken this course
has earned a very good grade



Not everyone gets an "A"

Meet your love connection



The fame and notoriety



The screenshot shows the Stanford University website homepage. At the top, there's a red navigation bar with the Stanford logo and 'STANFORD UNIVERSITY' text. Below this are tabs for 'About Stanford', 'Admission', 'Academics', 'Research', and 'Life On Campus'. A search bar is visible on the right. The main content area is divided into several sections: 'EVENTS' with a list of upcoming events (e.g., S.F. Shakespeare Festival, The Eye of the Beholder), 'UNIVERSITY NEWS' with articles like 'Eclectic blend' and 'Analyzing land use', and 'ON STANFORD.EDU' with links to 'Stanford Medicine', 'Global Gateway', and 'Center for Professional Development'. A sidebar on the right contains 'GATEWAYS FOR...' (Students, Faculty & Staff, etc.), 'TOP DESTINATIONS', 'SCHOOLS', 'ACADEMIC DEPARTMENTS', 'HOSPITALS', 'LIBRARIES', and 'ON THE WEB'.

The screenshot shows the Stanford Alumni website. It features a large banner image of the Stanford Memorial Arch with the text 'STANFORD ALUMNI' overlaid. Below the banner, there's a 'Welcome!' section with login options. A central article titled 'New Digs on Campus for Economic Policy Research' is highlighted with a red border. To the left of this article is a photo of L.A. Cicero holding a cane, with a caption 'Photo: L.A. Cicero/Stanford News Service'. Below the article is a 'REWARD YOURSELF' section. The right sidebar contains a 'Scoreboard' for M. Basketball and a 'Synchro' section. A 'Site Spotlight' section is at the bottom.



You are compelled to do it



*“Top motivational factors for engineering students are behavioral, psychological, **social good**, and financial.”*

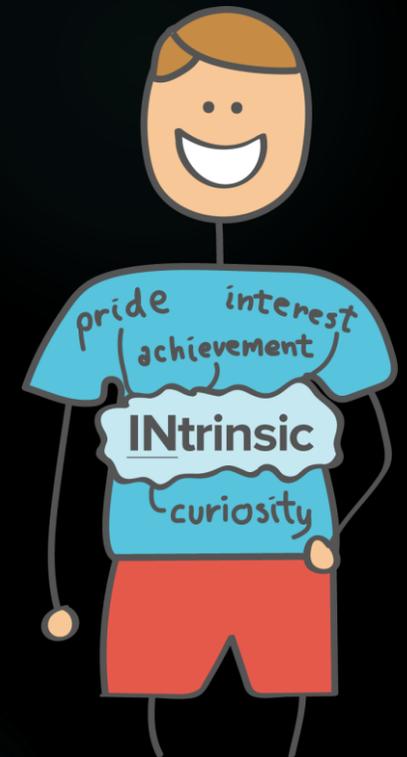
Center for the Advancement of Engineering Education



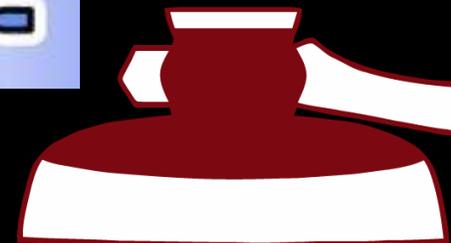
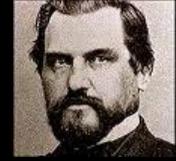
Service Learning



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



Rabbi David Jaffe

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

David L. Jaffe, MS
Course Lecturer



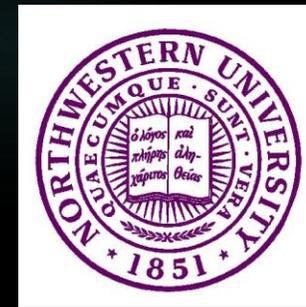
"Partly Sunny"



More about Me



Go Blue!



Go Cats!



Go Cardinal!

- Education:

- University of Michigan - BS in EE
- Northwestern University - MS in BME



At 22

- Employment:

- Hines VA Hospital
- VA Palo Alto Health Care System - RR&D



Hines VA Hospital



VA Palo Alto RR&D

- Stanford:

- ME170, ME218, ME294, ME310, BioE141, assistive technology projects



VA Palo Alto

My Passions

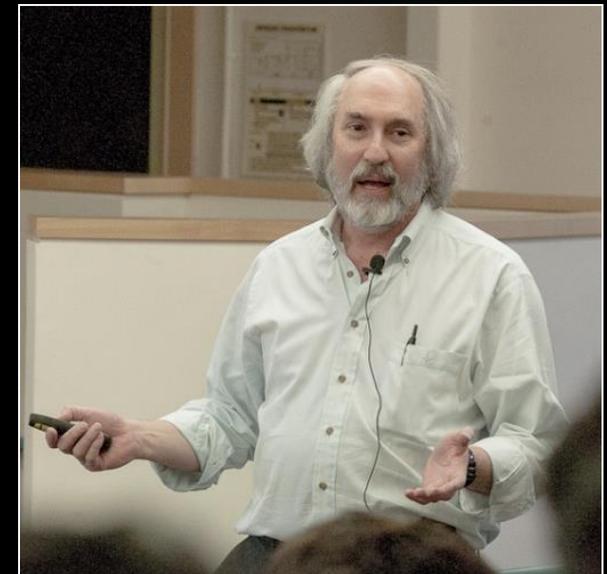
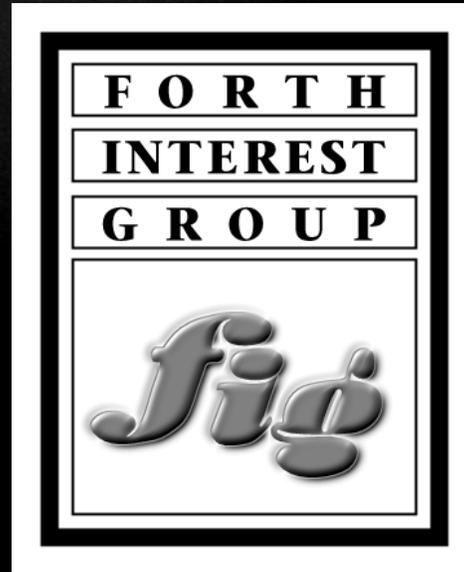
- ▶ Inspired by “Watch Mr Wizard”
- ▶ Early home computer adopter - 1975
- ▶ Forth programming language devotee, embedded systems
- ▶ Teaching human aspects of technology and engineering



Don Herbert



My computer - 1978



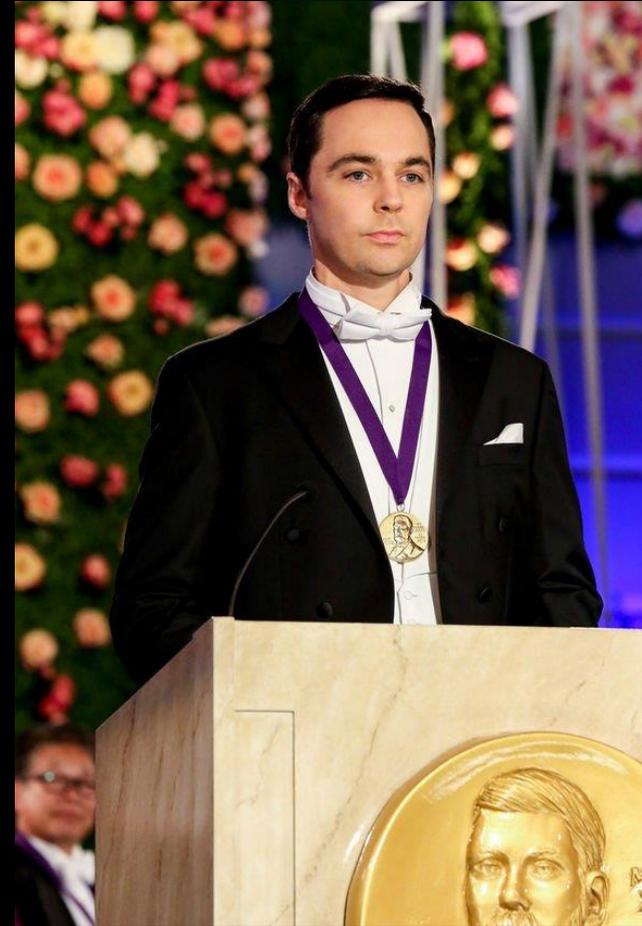
Five numbers that define me

1. 11/11/1979 - arrived in California
2. 15 - years teaching the course
3. 4.6 / 5.0 - 2019 course evaluation score
4. 42 - number of students enrolled last year
5. 957 - number of cookies served in course last year



My Biases and Thinking

- ▶ Engineering
- ▶ Fabricating & testing functional prototypes with real users
- ▶ Use 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 - Kat McNeill



Kat is a co-term student in Sustainability Science and Practice and did her undergraduate degree in Computer Science. She is passionate about contributing to a socially just and environmentally stable world for everyone to live in. Kat has worked in a variety of spaces, from doing geophysics research to adventure photography to software engineering. Outside of school, she can be found rock climbing, over-caffeinating with coffee, woodworking, and generally trying out new things.

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 online form
 - ▶ Sign in:
 - ▶ Students - attendance, every class session – online form
 - ▶ Community members - no need



Who are these students and why are they smiling?



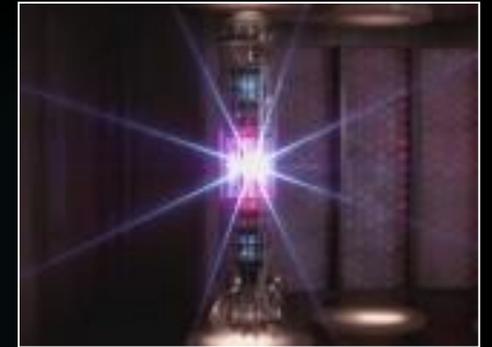
Class Genesis

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

Star Trek Genesis Project



The Genesis Planet



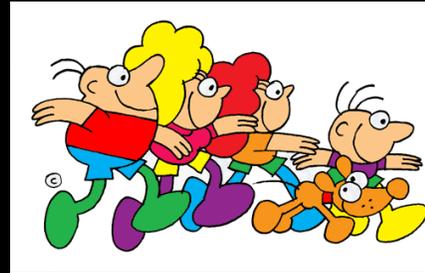
The Genesis Device



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**?



**Expectations are
premeditated
resentments.**

- Alcoholics Anonymous

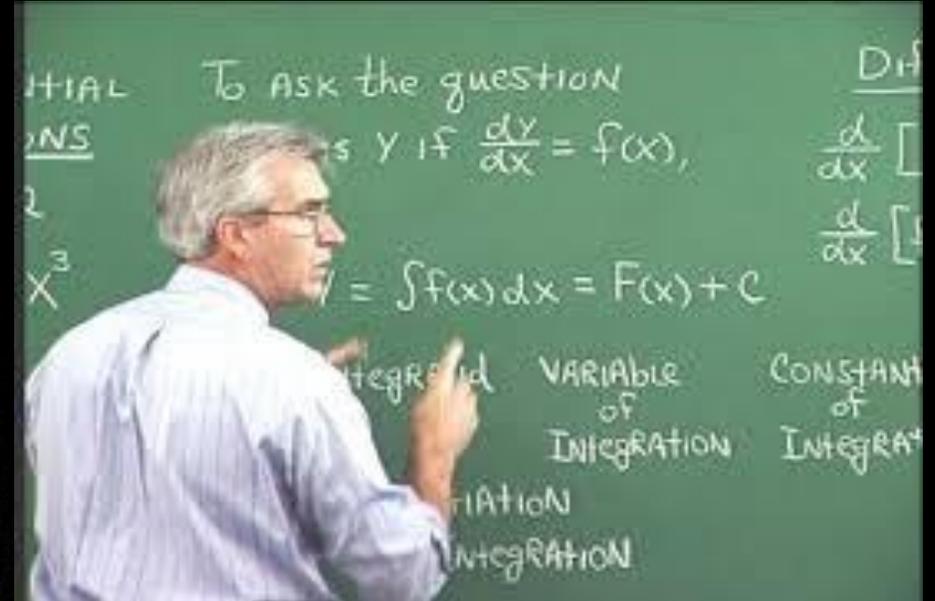
DANGER

EXPECTATIONS

Are These Your Expectations?



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

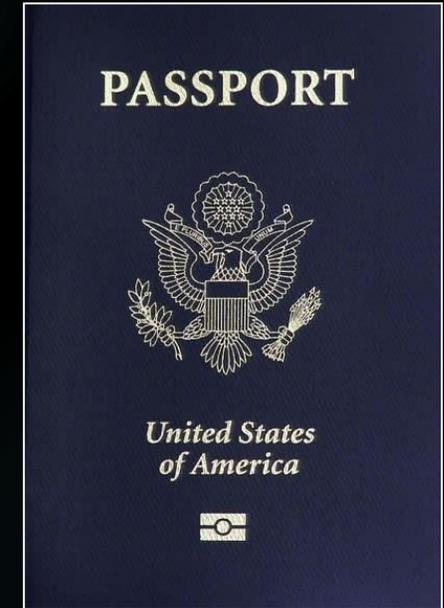
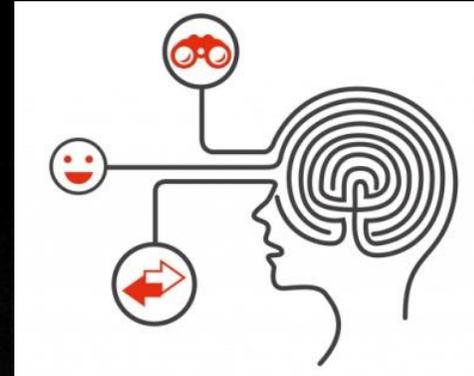


$$e^{i\pi} = -1$$

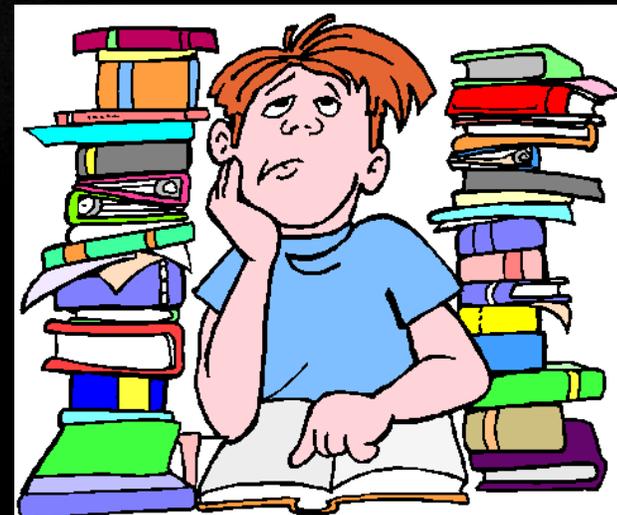
The only equation you may see

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*



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

TUSB 2011 Winter Course Guide: spice up your courseload!

Posted by **Kristi** on November 5, 2010 1:10AM



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

Burst the Bubble: field trip-based



Welcome to the Farm

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 online sessions** exploring perspectives in the design and use of assistive technology by engineers, designers, entrepreneurs, clinicians, and persons with disabilities - and **virtual** field trips, a **film screening**, and a **virtual** assistive technology faire.



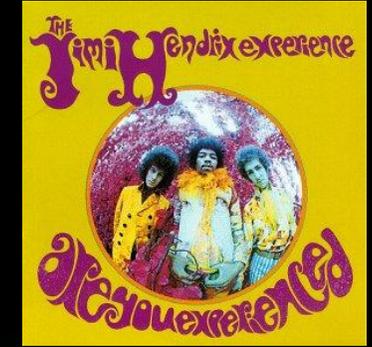
- ▶ Opportunities for **thought, reflection, and discussion**



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



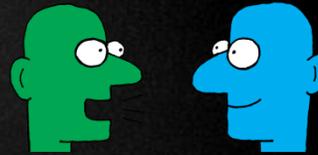
Student Experience



- ▶ 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 project:



- ▶ Engage in a comprehensive **project experience** that includes working with real users of assistive technology to identify problems, prototype solutions, perform device testing, practice iterative design, and communicate results
- ▶ **Employ engineering and design skills** to help people with disabilities and older adults increase their independence and improve their quality of life

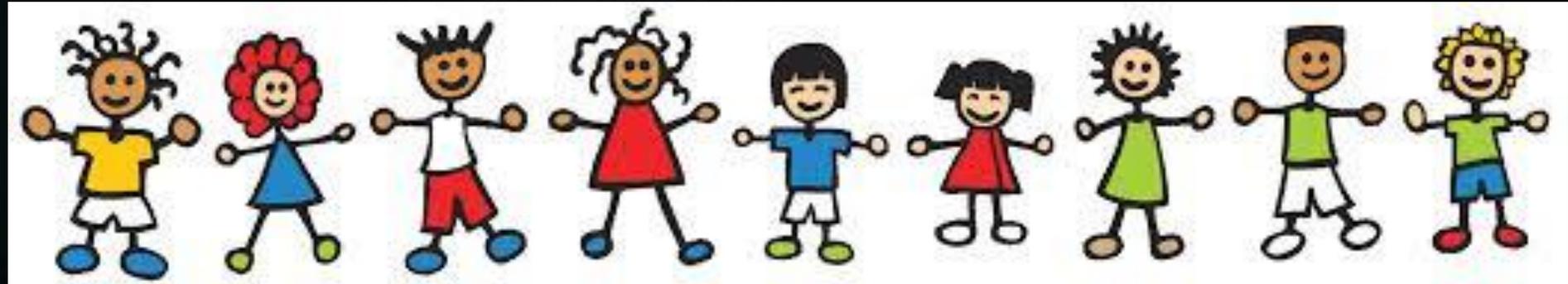


Your Experience

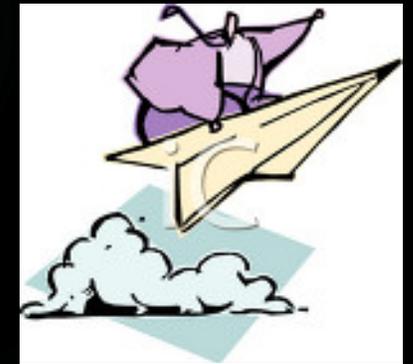


How does this course fit into your life and education?

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



Credit Options



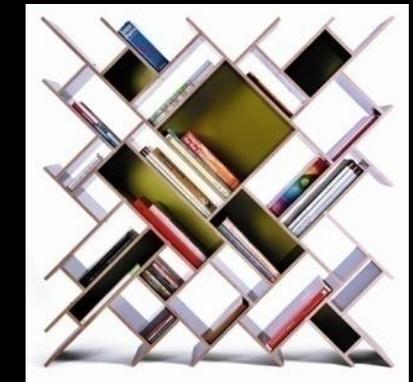
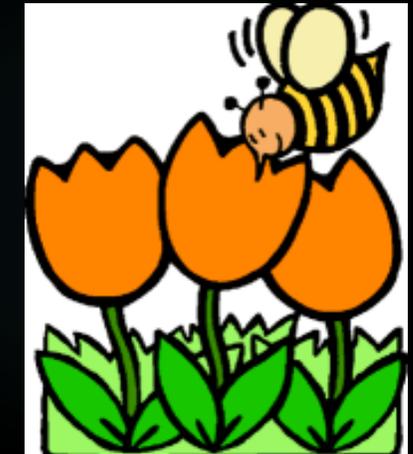
1-unit option:



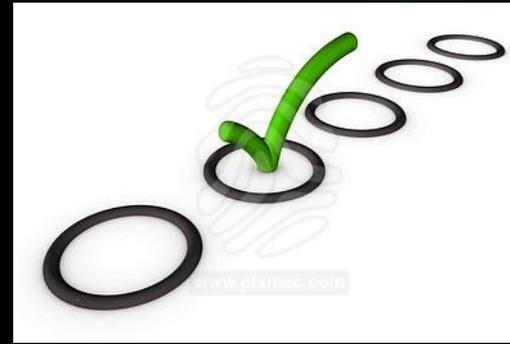
- ▶ **No letter grade (CR/NC)**
 - ▶ Attend **at least 15** ENGR110/210 lectures (including this one)
 - ▶ No participation in a project

2-unit options:

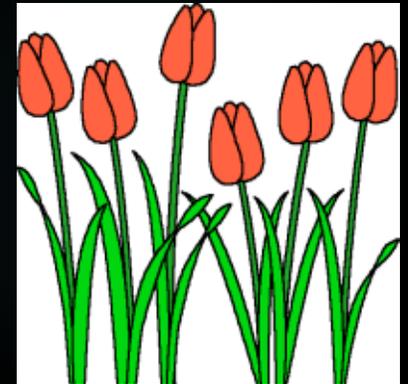
- ▶ **Letter grade or CR/NC**
 - ▶ Attend **at least 15** ENGR110/210 lectures (including this one)
 - ▶ Pursue a project: interview an individual with disabilities and
 - ▶ research an assistive technology topic,
 - ▶ paper design of an assistive technology device,
 - ▶ create of a work of art,
 - ▶ 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



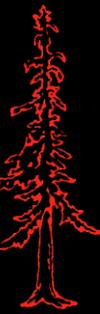
Other Options



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

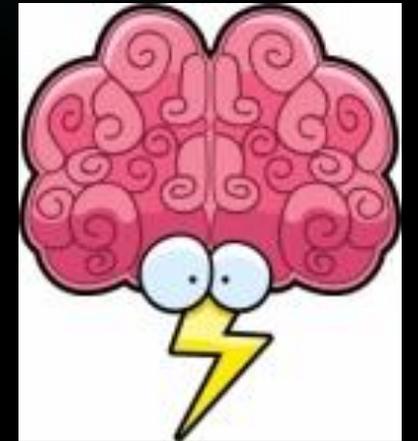


Project Activities

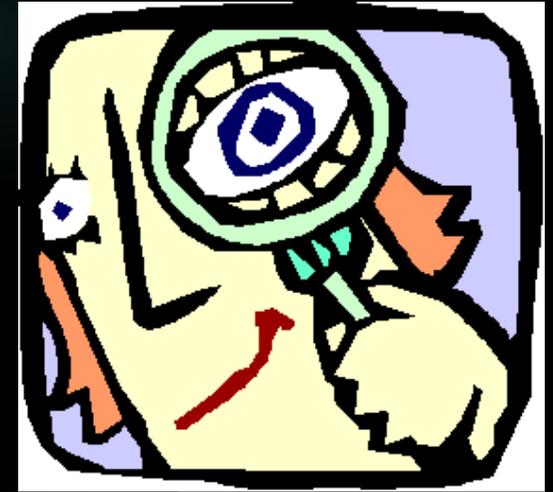
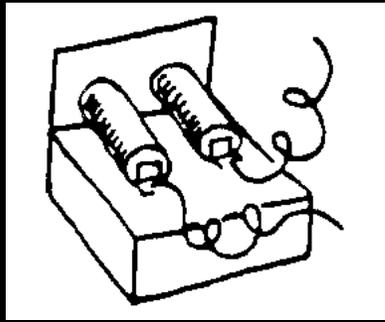


For those working on a **project**:

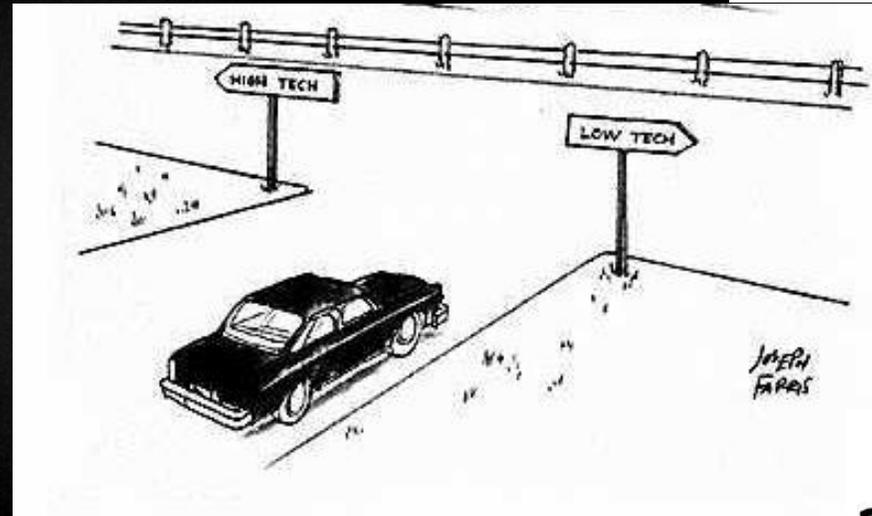
- ▶ Review candidate project descriptions & listen to pitches
- ▶ Select a project
- ▶ Investigate **project problem** with an individual with a disability
- ▶ Evaluate the situation to further **understand the problem**
- ▶ **Gather relevant background information** for the project, including any prior 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



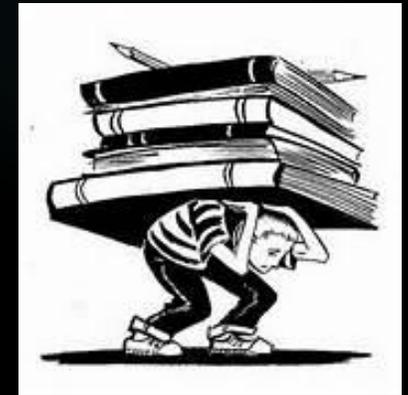
Why you may want to



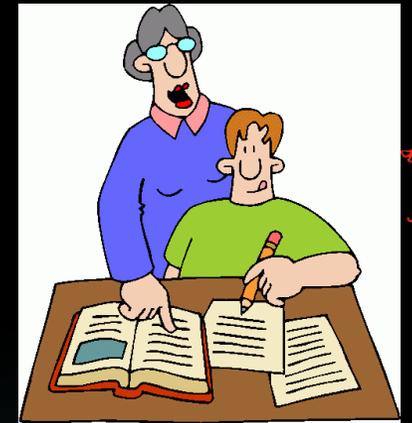
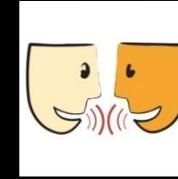
If you have enrolled for **two units**, you may want to consider taking the course for **one unit** or **waiting until next year** if:

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 **4 hours per week** to your project.
6. You would like to work on a **team** project.

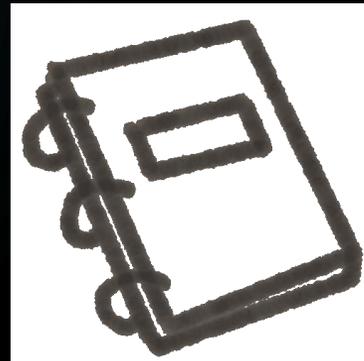
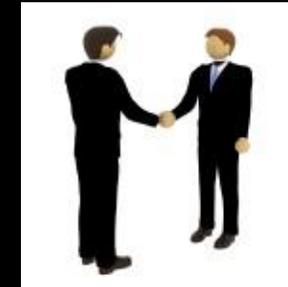


Assignments



For those working on a project

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

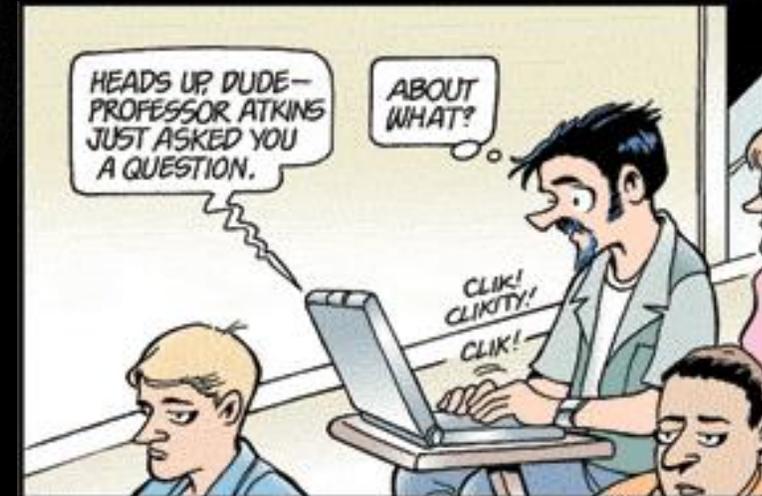
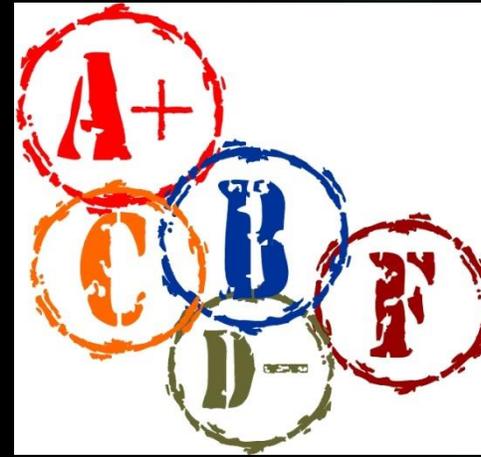


Grading

For those working on a project:

- ▶ Mid-term presentation 0%
- ▶ Mid-term Report 10%
- ▶ Final Report 40%
- ▶ Final Presentation 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.



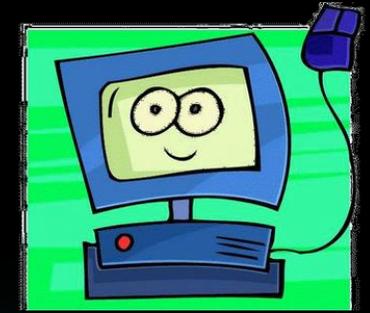
Optional Follow-on Activities: Independent Study or SURI (ME)



- ▶ 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

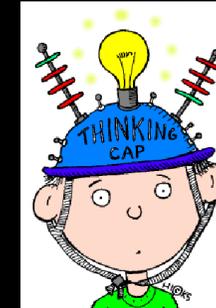


Discussion Topics

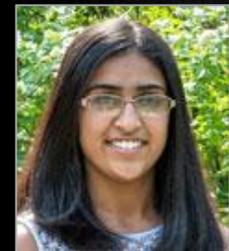
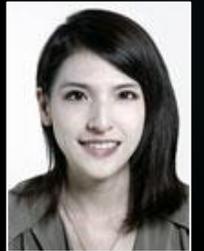


- ▶ Who is Disabled?
- ▶ The Upside of Failure!
- ▶ Antique technology
- ▶ New technology
- ▶ AT device review
- ▶ Famous people with disabilities
- ▶ Assistive robotics
- ▶ Student request

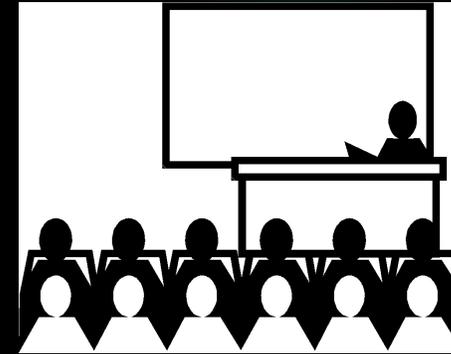
- Video theater
- Everything is a prototype / AT
- In the news
- What would MLK say about AT?
- Suffering & Need
- Ethical dilemmas
- Marketing terms
- Accessibility
- Product costs



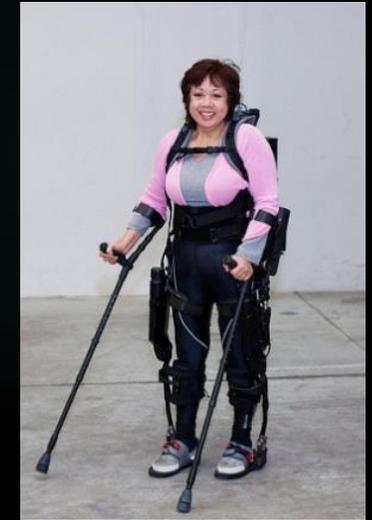
Guest Lecturers



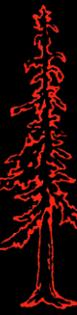
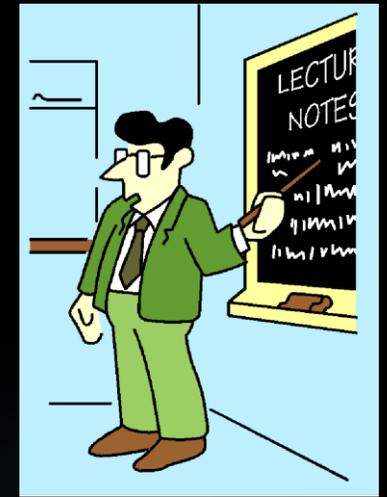
Lecture Titles 1 of 2



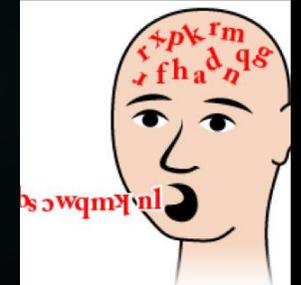
- ▶ Course Overview & Introduction to Assistive Technology
- ▶ Project Pitches & Team Formation
- ▶ Creating Assistive Technologies - Understanding the Problem
- ▶ Bridging the Gap between Consumers and Products in Rehabilitation Medicine
- ▶ Perspectives of Stanford Students with a Disability
- ▶ Designing Beyond the Norm to Meet the Needs of All People
- ▶ Problems of Adaptive Aesthetics and Design
- ▶ Issues of Human Interface Design in Prosthetics
- ▶ From Idea to Market: Eatwell, Assistive Tableware for Persons with Cognitive Impairments
- ▶ The Design and Control of Exoskeletons for Rehabilitation



Lecture Titles 2 of 2



- ▶ Aesthetics Matter & Empathy and Problem Definition
- ▶ Improving Home Environments for Older Adults
- ▶ Virtual Field Trips to Magical Bridge Playground & Field Trip to VA Palo Alto Spinal Cord Injury and Brain Injury Services
- ▶ Normalcy Fallacy: Reimagining Mobility for Scientific Discovery & Innovation
- ▶ Designing Exoskeletons and Prosthetic Limbs that Enhance Human Performance
- ▶ Machine Learning, Biosensing, Virtual Reality Technology – Converging to Transform Healthcare
- ▶ Wheelchair Fabrication in Developing Countries
- ▶ Student Project Final Presentations & Demonstrations



Lectures

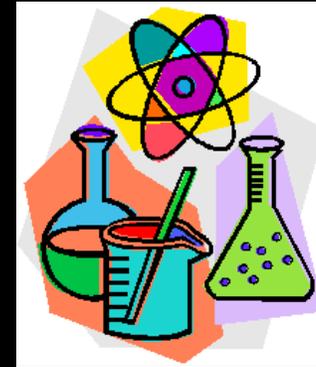
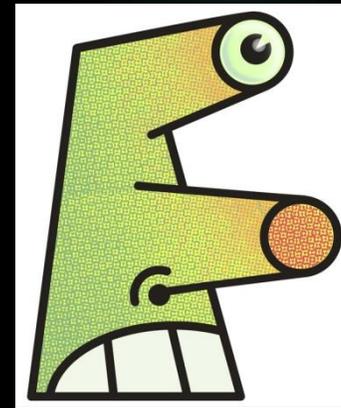
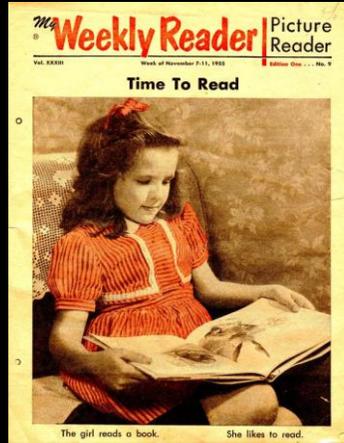
- ▶ Lecture topics are chosen for their interest, but may not relate to specific projects
- ▶ Some class sessions may run overtime - students will be given an opportunity to leave at 5:50pm



Technology Tidbits

Weekly Readings

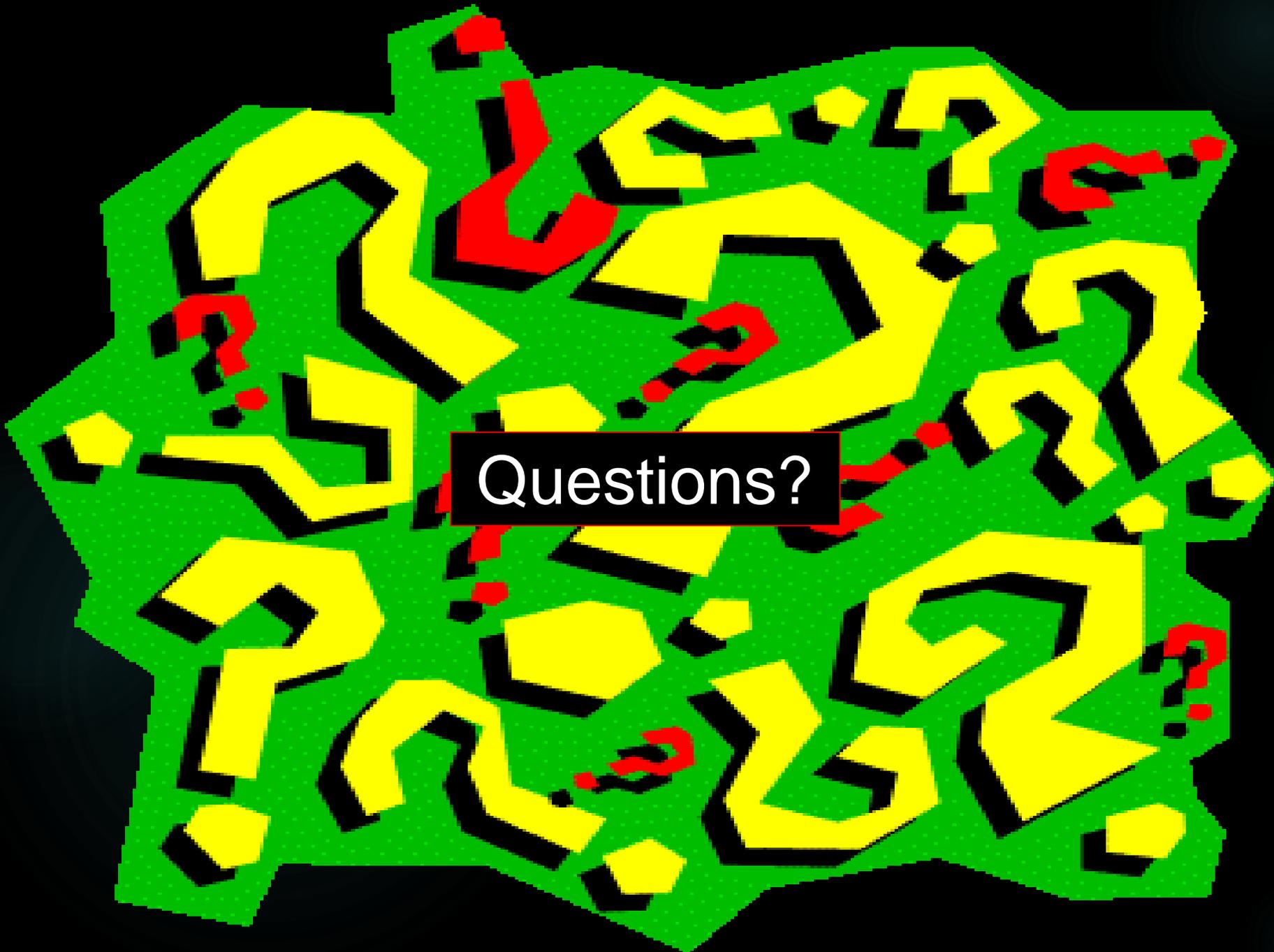
- ▶ New products
- ▶ R&D
- ▶ Interesting articles



Tell Your Friends



Openings for 1 or 2 credit unit options



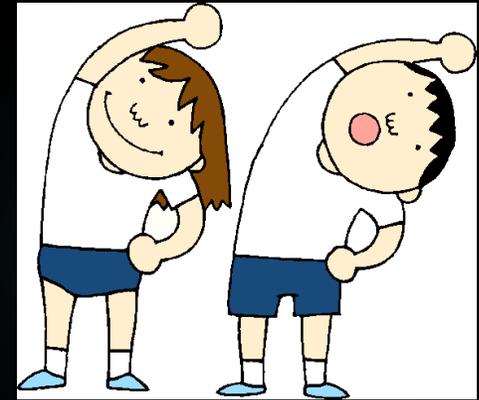
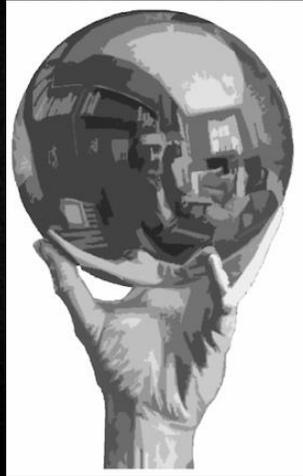
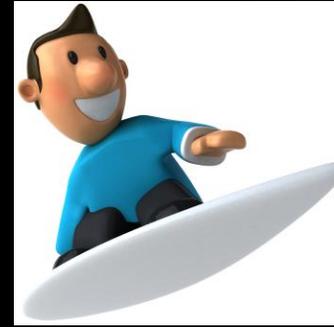
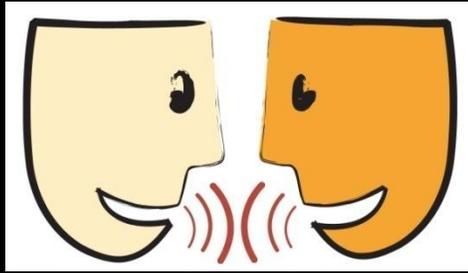
Questions?



QUESTIONS
ANSWERED
HERE
EVEN THE
SILLY ONES

Break Activities

- ▶ Breakout rooms
- ▶ 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

