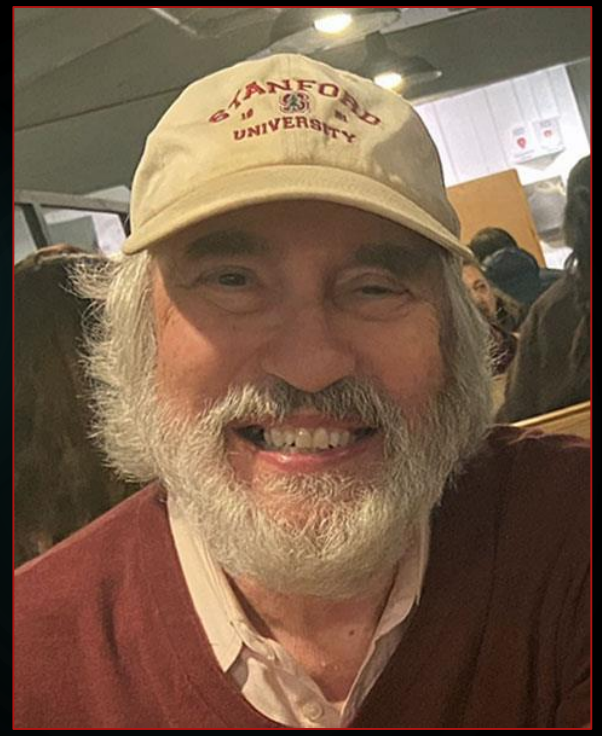
January 6, 2026

Course Overview & Introduction to Assistive Technology

ENGR110/210
Perspectives in Assistive Technology



David L. Jaffe, MS

Instructor

20

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

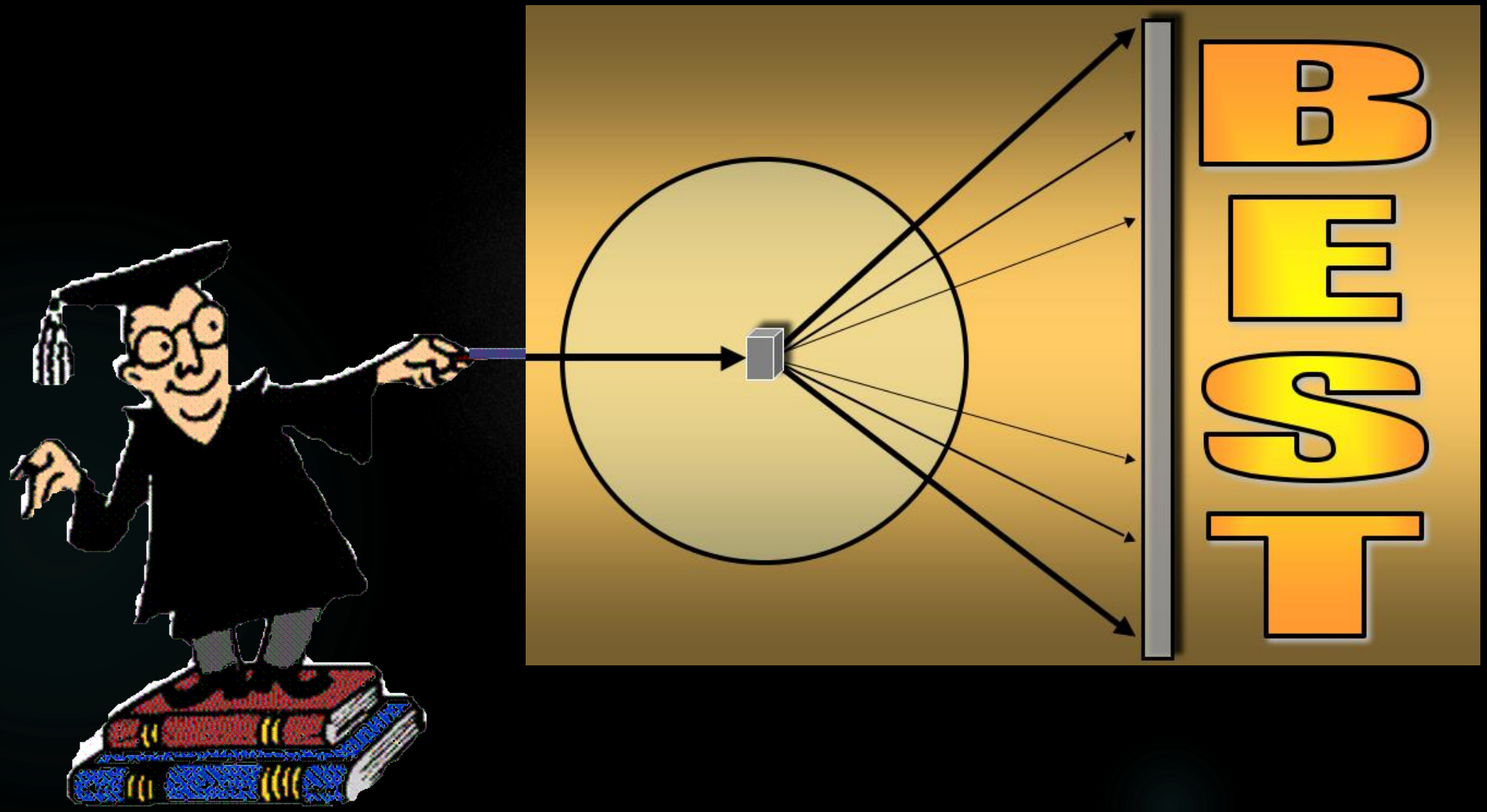
“Have I made a good choice by enrolling in *Perspectives in Assistive Technology?*”







This is the best course I teach



This is the best assistive technology course at Stanford





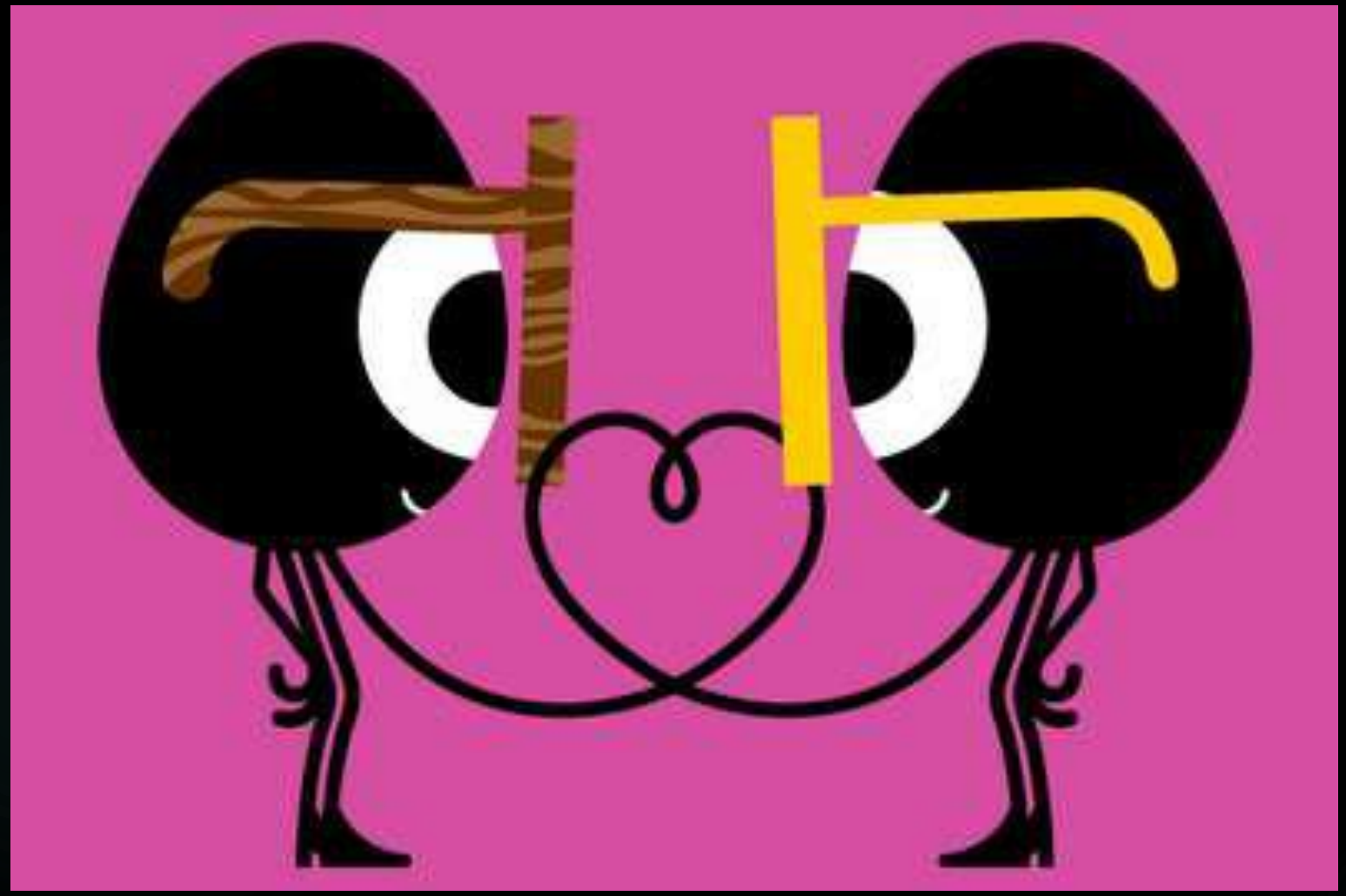
Everyone who has taken this course has earned a very good grade





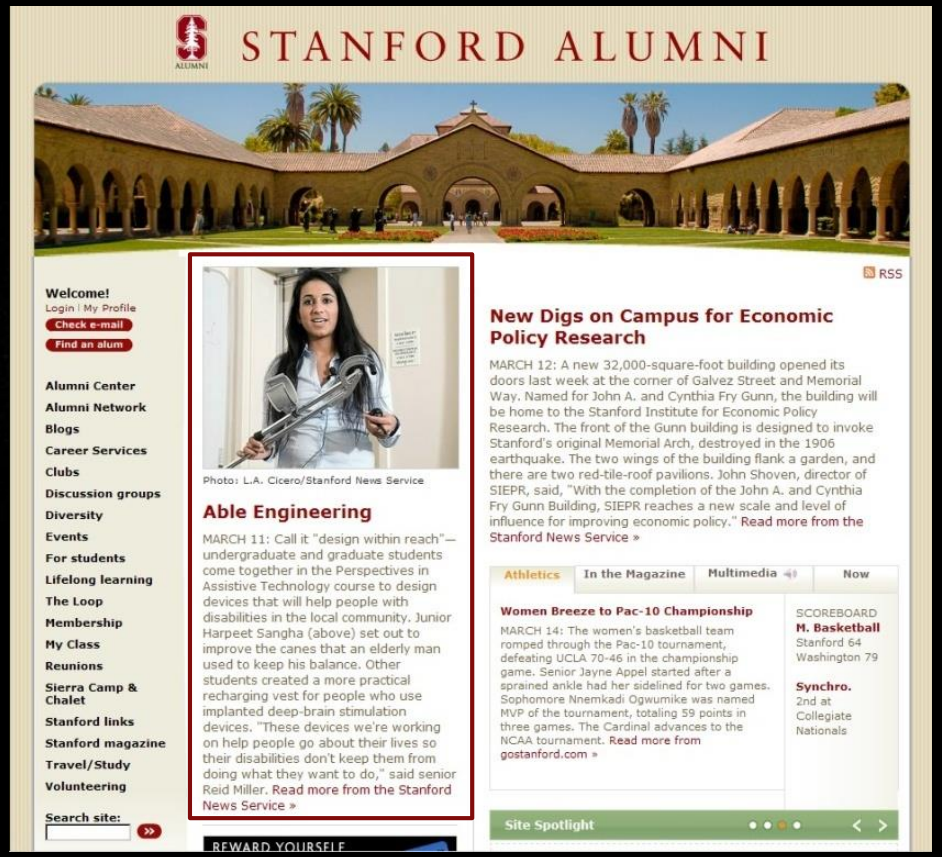
Not everyone gets an “A”

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



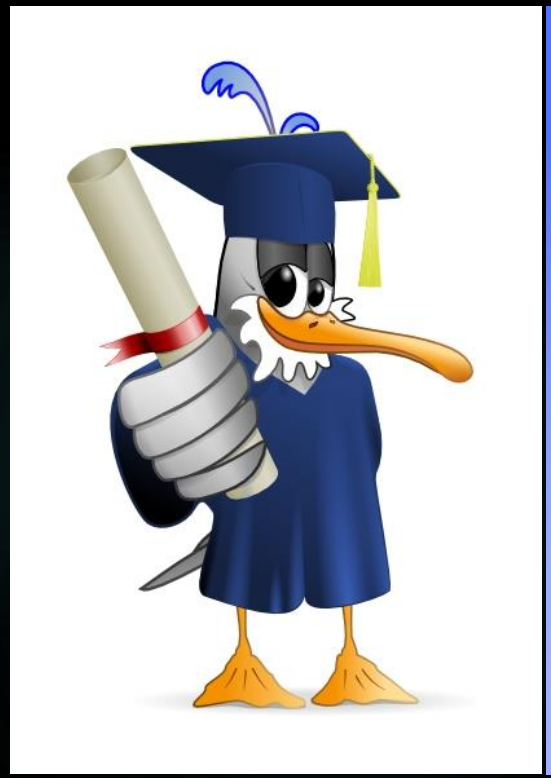
Local Community



"Our purpose in life is to help others along the way."
Sandra Day O'Connor

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







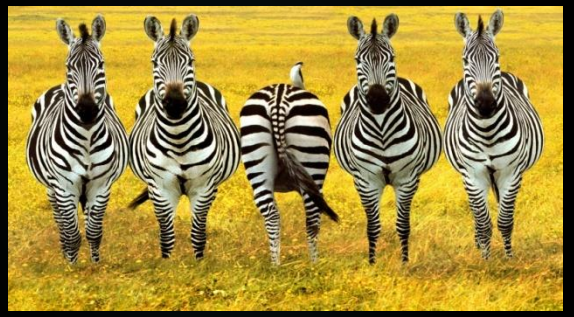


You want to take something completely different











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 Instructor



"Partly Sunny"



Warden David Jaffe

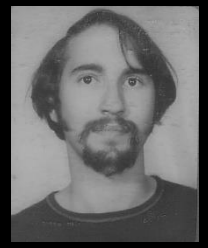
More about Me

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

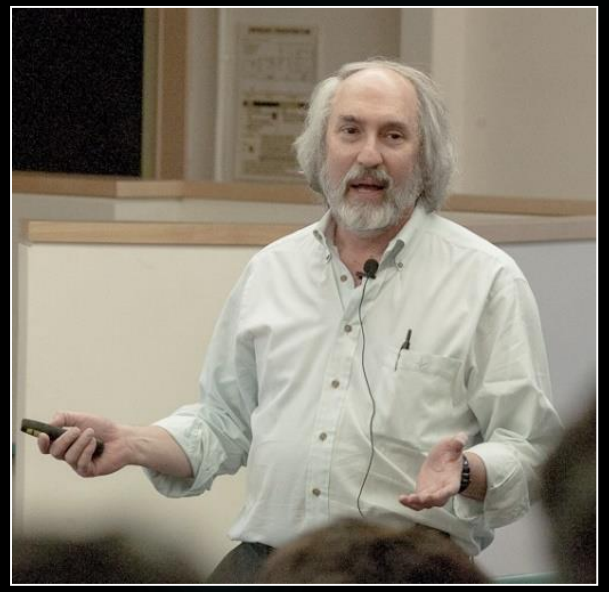
- Inspired by “Watch Mr Wizard”
- Early home computer adopter - 1975
- Forth programming language devotee, embedded systems
- Teaching human aspects of technology and engineering



My computer - 1978

FORTH INTEREST GROUP

fig



Five numbers that define me



11/11/1979 - arrived in California

19 - years teaching the course

4.6 / 5.0 - 2019 course evaluation score

35 - number of students enrolled last year

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
- Avoiding subjective analysis



“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 - Tori Hoge



"I'm a coterminal student in Mechanical Engineering with a concentration in Biomechanical Engineering. I'm passionate about using mechanical engineering principles to design technologies that improve people's lives. My career interests lie in surgical robotics and developing assistive devices for rare and understudied diseases. Outside of class, I enjoy running, playing pickleball, and working on my car."

Today's Agenda

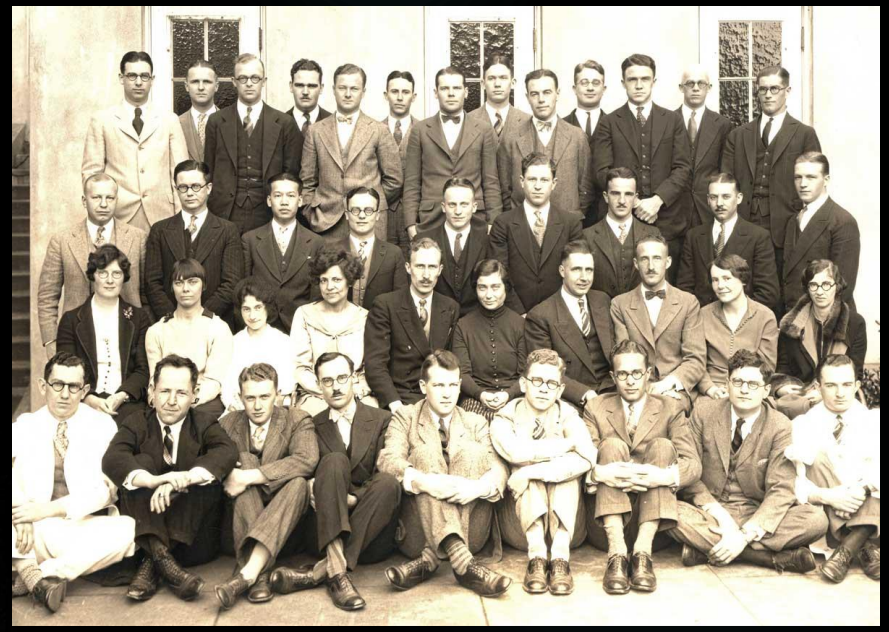


- Welcome to the Course
- Course description
- Introduction to Assistive Technology
  - What is Assistive Technology?
    Definition
    Population numbers
  - Assistive Technology research and devices:
    DJ projects at VA
    Existing devices and products
    New technology
- Student Projects
  -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

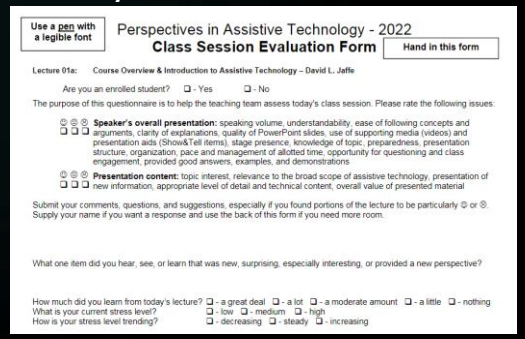




to the Class



- Welcome students and community
- Administrative items:
  - Lists & Forms:
    - Class Session Evaluation Form – fill out at end of class
    - Attendance List - enrolled students sign attendance list every class session
    - Community members - one-time signup list for course newsletter



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

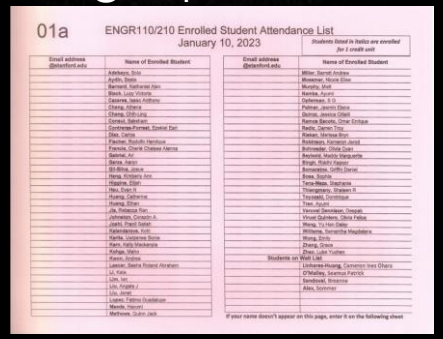
☹ 😐 ☺
❑ ❑ ❑ **Presentation content:** topic interest, relevance to the broad scope of assistive technology, presentation of new information, appropriate level of detail and technical content, overall value of presented material

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?

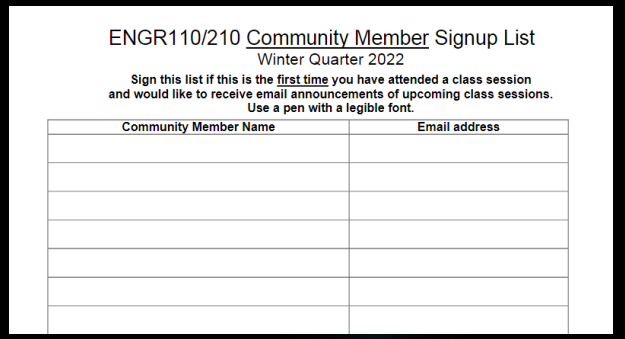
How much did you learn from today's lecture? ❑ - a great deal ❑ - a lot ❑ - a moderate amount ❑ - a little ❑ - nothing
What is your current stress level? ❑ - low ❑ - medium ❑ - high
How is your stress level trending? ❑ - decreasing ❑ - steady ❑ - increasing

Class Session Evaluation Form



01a ENGR110/210 Enrolled Student Attendance List
January 10, 2023

Attendance List



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

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

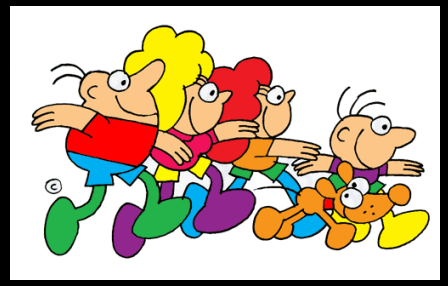


The Genesis Device



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













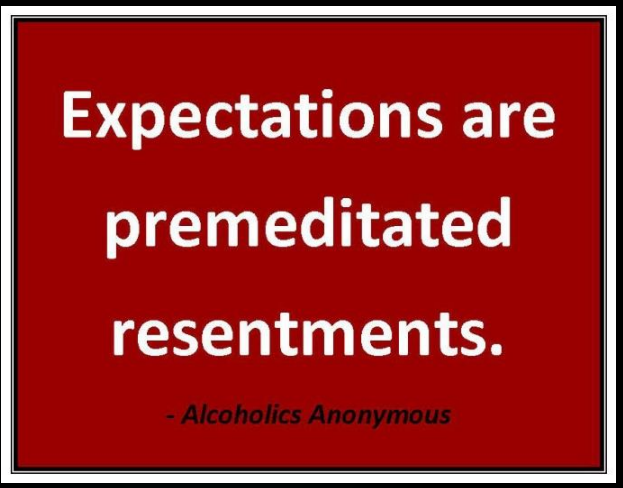


- Independent & critical thinking
- Analysis
- Problem-solving
- Working in a team
- Working in the community
- Public service
- Service-learning
- Designing, fabricating, testing, analyzing, iterating
- Communicating: reports, presentations, class participation
- Leadership & Organization

What kind of course are you expecting?

- Love to study; do homework and problem sets; take quizzes, exams, and finals?
- Relish buying and 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?

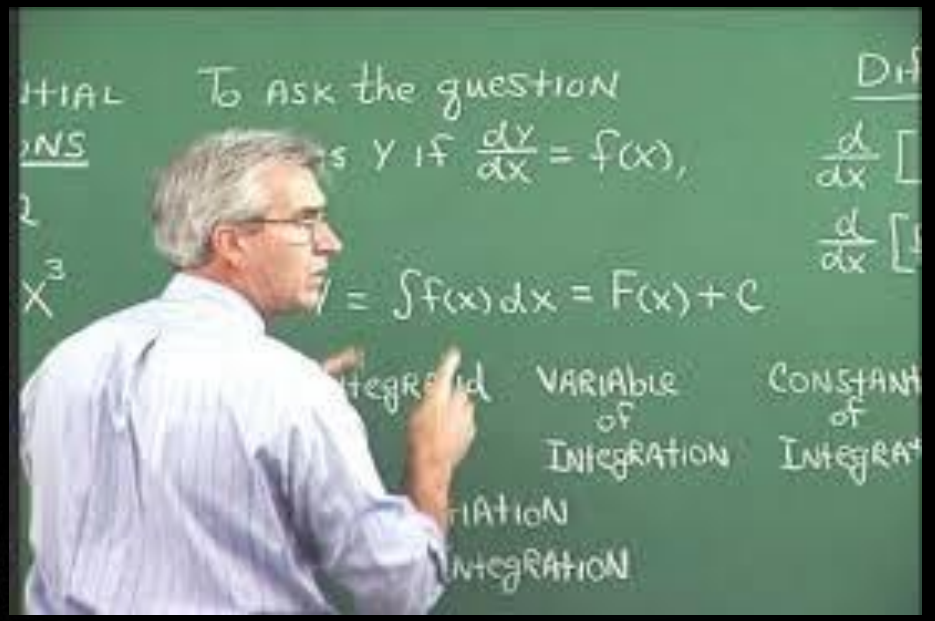






Are These Your Expectations?

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

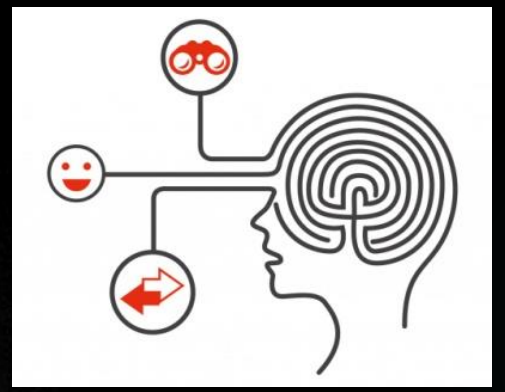


$$e^{i\pi} = -1$$

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 not with big companies or in foreign countries
- No finals, exams, problem sets, or quizzes
- No books to buy
- Some weekend reading - 5 minutes
- No boring lectures



"Not that there is anything wrong with that"







What this Course isn't

No in-class instruction in:

- Tool use, soldering
- Fabrication techniques
- 3D printing
- Laser Cutting
- Mechanical systems
- Electronic & Mechatronic systems
- Selection of materials

- Report writing
- Presenting

- Time management





What this Course is

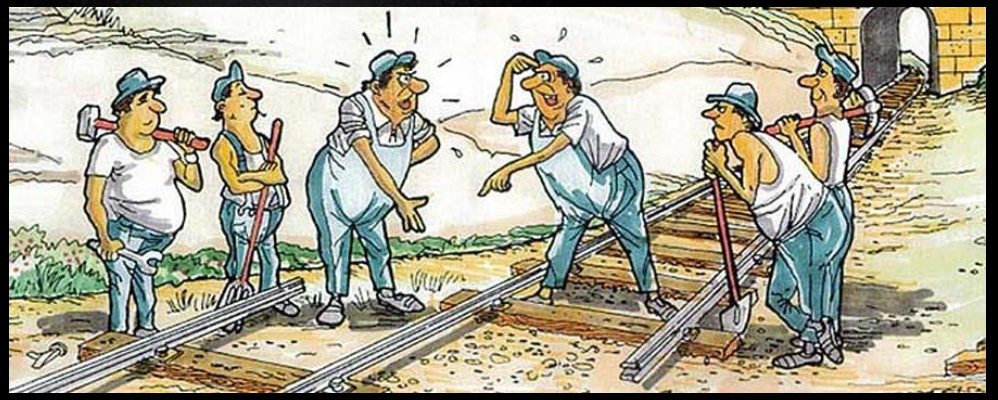






- Technology and people
- Assistive Technology in its many forms
- Engineering design-development process:
  - **Fully understand the problem**
  - Brainstorming
  - Prototyping, testing
  - Refining, iterating
  - Communicating







- Working on a project
- Engaging with local community members
- 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



Unbiased. Uncensored. Stanford in real time.

THE UNOFFICIAL STANFORD BLOG

the blog | events | features | about us | sign up | free stuff

« 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, a film screening, and an 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





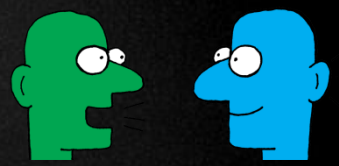




- Gain an appreciation for the social, medical, and technical challenges in developing assistive technologies
- Learn about assistive technology concepts, design strategies, ethical issues, and interaction of people with technology



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





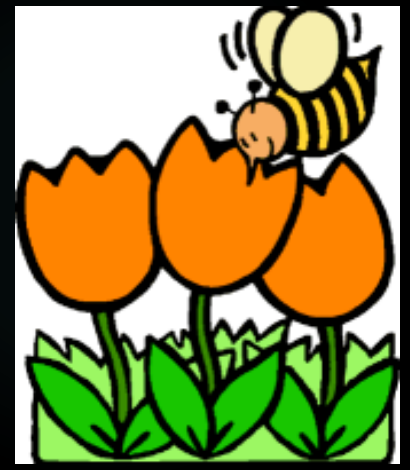


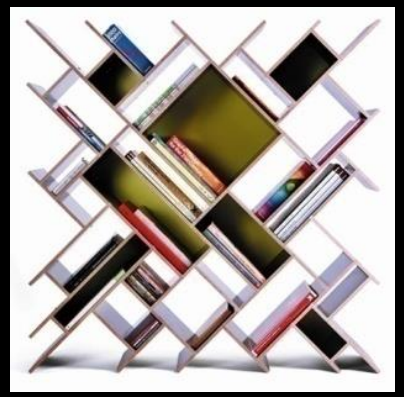
1-unit options:



- 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





Credit Options



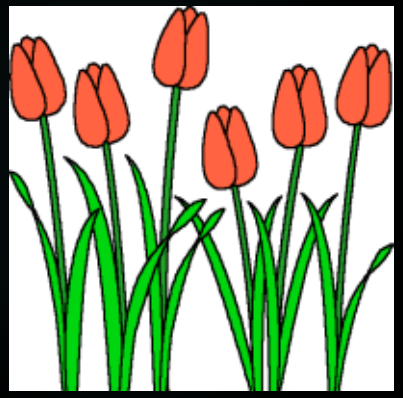




3-unit options:



- attend ENGR110/210 lectures, participate in a team project
  - optionally continue with independent study (ME191) effort in the Spring Quarter (with approval of your faculty advisor)





Other Options

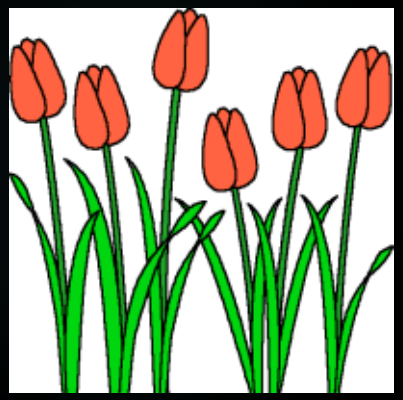






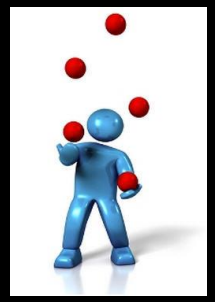
- Optionally, continue with independent study (ME191 or ME391) effort in the Spring or Summer Quarter (with approval of your faculty advisor)







Project Activities

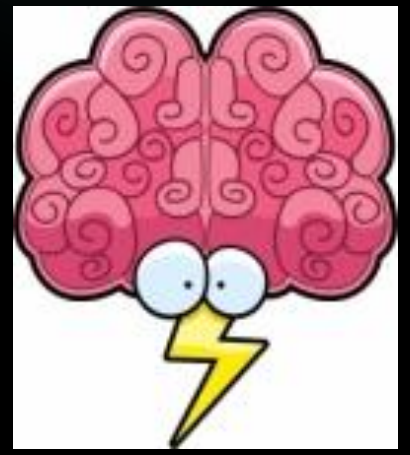




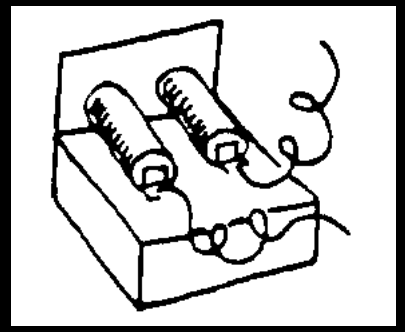
For those working on a team project:



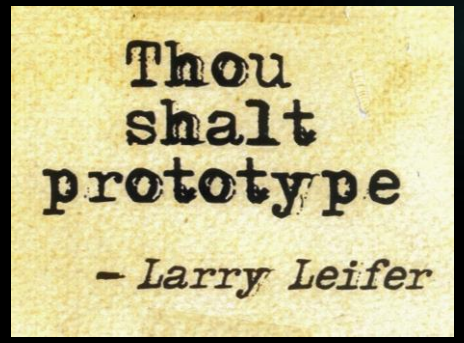
- Review candidate project descriptions & listen to candidate team project pitches on Thursday
- Select a project & form a team
- Investigate project problem with an individual with a disability
- Evaluate the situation to **fully understand the problem**
- Gather relevant background information for 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 the project experience

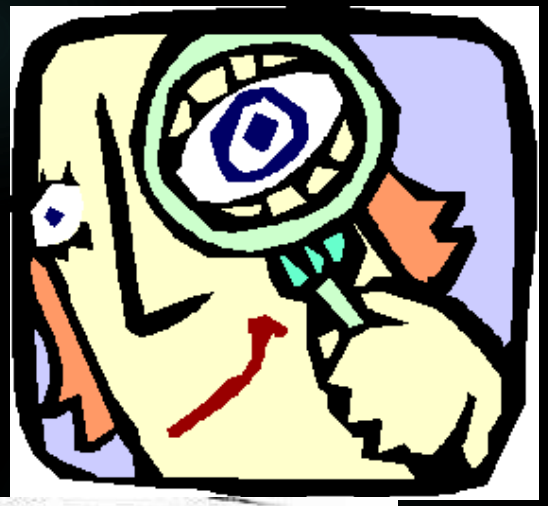


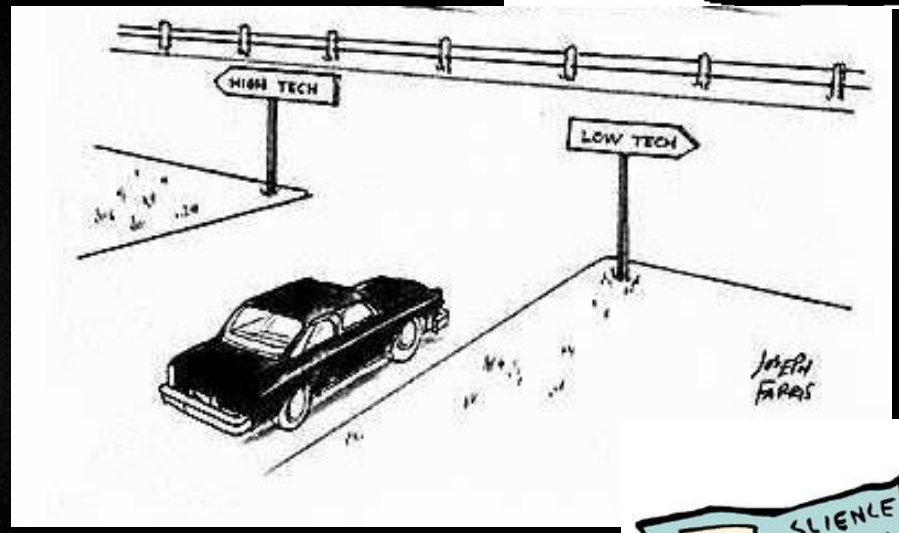
Projects



- "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 engineering design process and demonstrating prototype functionality are priorities







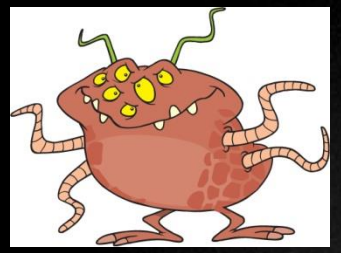


Your Project Team is Like a Company or Start-Up

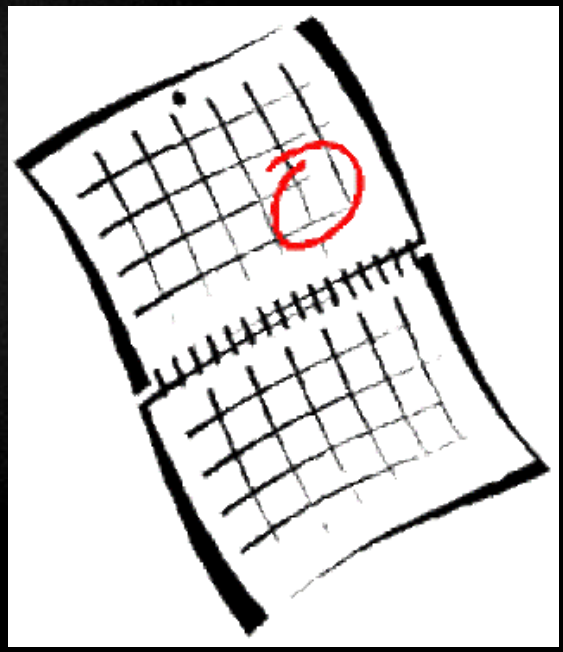




- Team members



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







Project Team Identification

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





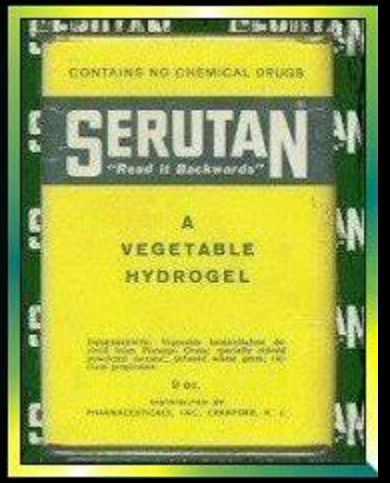












Serutan is "Nature's" spelled backwards



Why you may want to



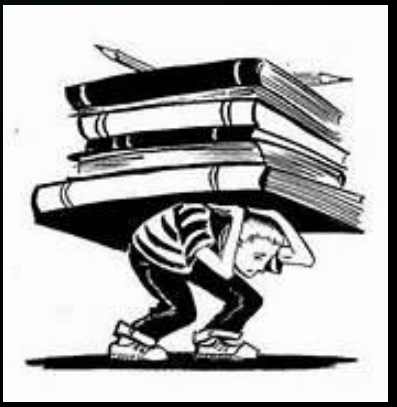


If you have enrolled for three credit units, you may want to consider taking the course for one unit or waiting until next year if:

Take it twice!

1. You are not graduating, or
2. If you have very limited fabrication experience, or
3. Good time management skills are required if you are taking other project courses such as ME112, ME170, ME203, ME210, ME218, ME310, BioE141, or …,
4. If you have to miss many lectures, or
5. You are not able to devote at least 5 hours per week to your project.







Assignments





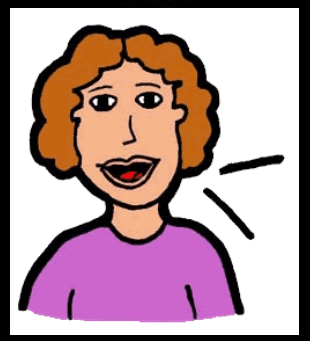
For those working on a **team** project:

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





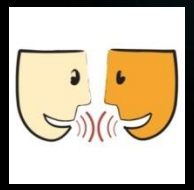






Assignments



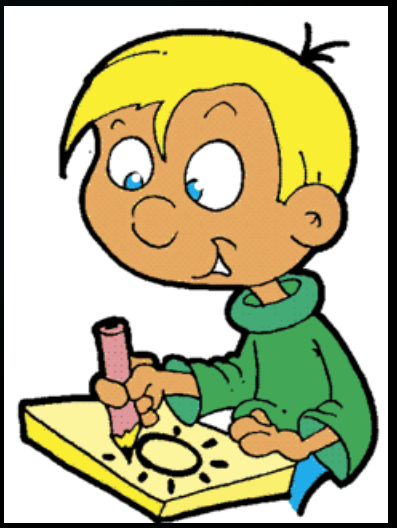




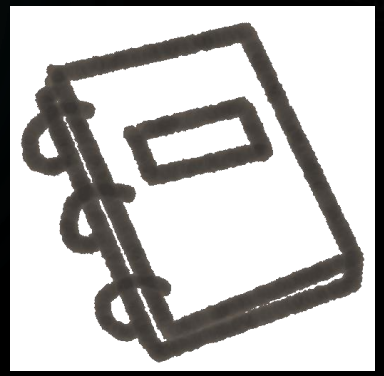
For those working on an **Individual** Project

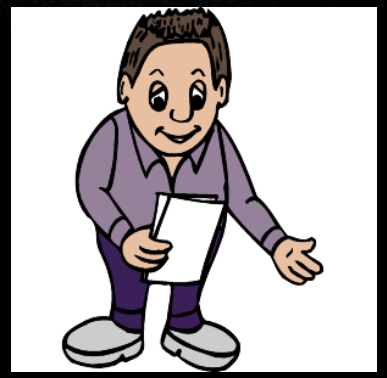
- Meet with Dave to agree on a project
- Communicate your project progress **weekly**
- Individual Presentation and End-of-term Report
- Reflect on your personal project experience











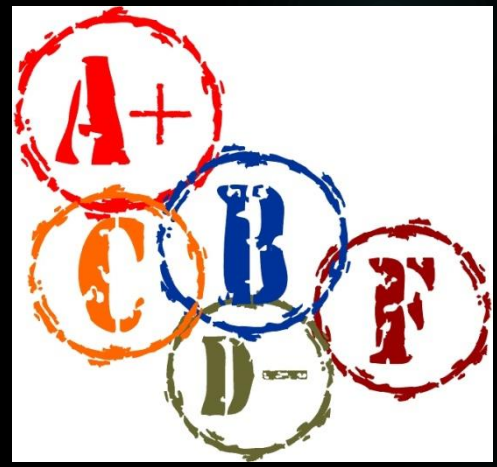


Grading

For those working on a team project:

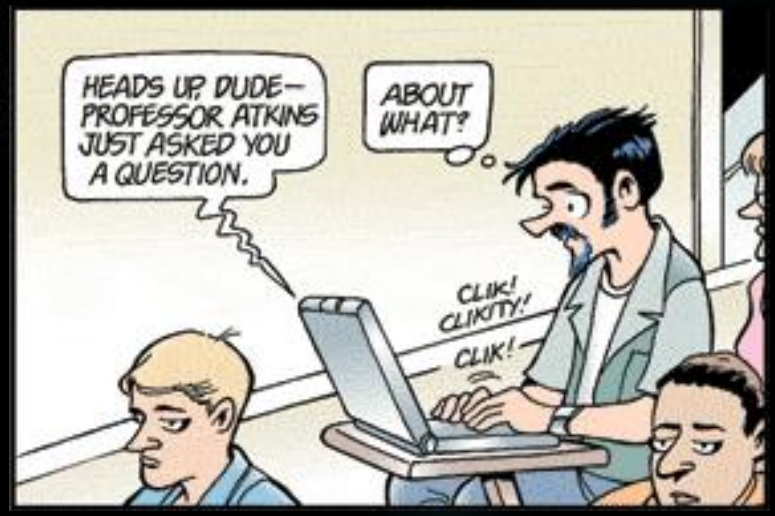
- Mid-term Presentation 10%
- Mid-term Report 10%
- End-of-term Presentation 20%
- End-of-term Report 20%
- Prototype Design & Functionality 15%
- Project Suggestor's Feedback 15%
- Participation 10%

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:



- End-of-term Presentation 45%
- End-of-term Report 45%
- 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)

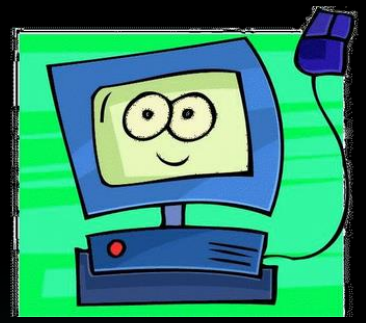


- Continue brainstorming additional design approaches
- Evaluate the approaches and select one to pursue
- Prepare an updated design proposal
- Perform detailed design and analysis
- Prepare a midway report
- Build a first cut prototype to demonstrate design feasibility
- Test the prototype and get feedback 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



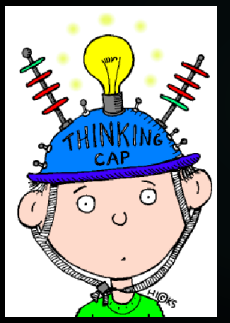
Discussion Topics





- 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 & Panelists













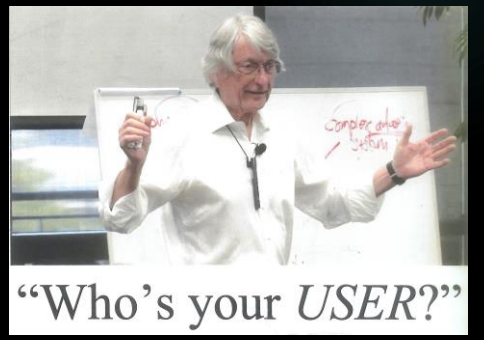








Project Suggestors







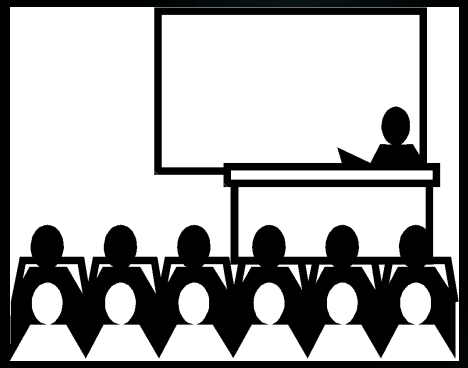






Lecture Titles 1 of 2



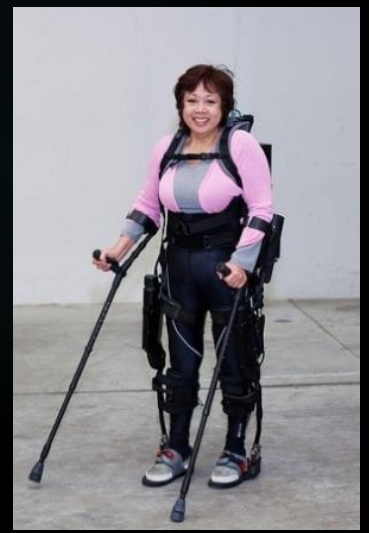






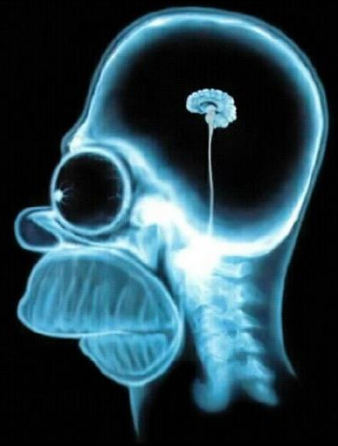
- Course Overview & Introduction to Assistive Technology
- Project Pitches & Team Formation
- Creating Assistive Technologies - Understanding the Problem
- Bridging the Gap between Consumers and Products in Rehabilitation Medicine
- Perspectives of Stanford Students and Faculty with a Disability
- Who, What, How of Digital Accessibility
- From Idea to Market: Eatwell, Assistive Tableware for Persons with Cognitive Impairments
- Brain-Computer Interfaces for Communication
- Thoughts on Assistive Robotics
- Assistive Robotics







Lecture Titles 2 of 2











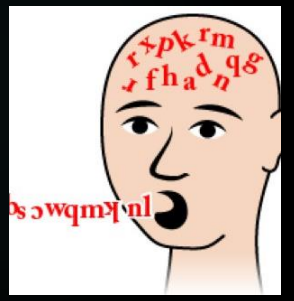




- The Design and Control of Exoskeletons for Rehabilitation
- Field Trip to Magical Bridge Playground
- Student Team Project Mid-term Presentations
- Issues of Human Interface Design
- Assistive Technology Faire
- Designing Beyond the Norm to Meet the Needs of All People
- Film Screening
- Wheelchair Fabrication in Developing Countries
- Student Team Project End-of-term Presentations
- Student Team Project End-of-term 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

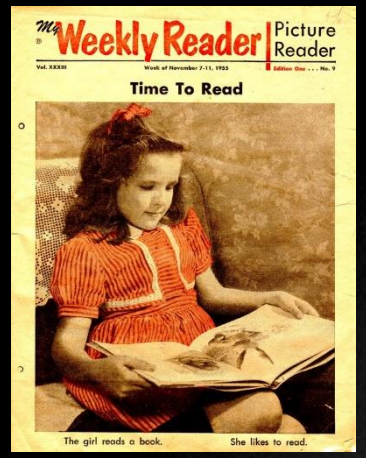


Technology Tidbits

Weekly Readings

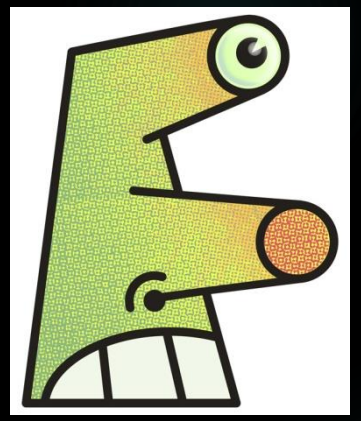
- New products
- R&D
- Interesting articles











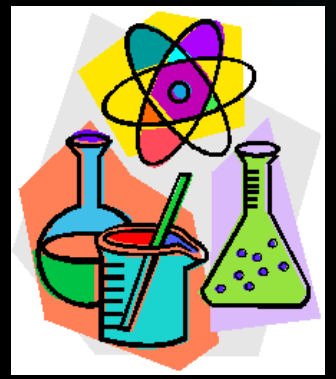
















Tell Your Friends









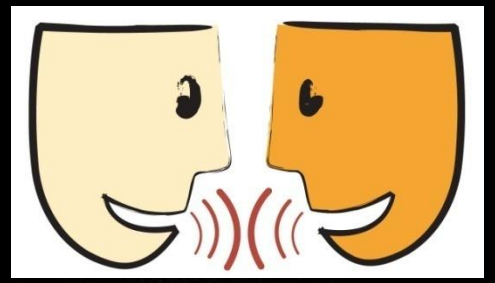


Openings for 1 credit unit options

Questions?



Break Activities



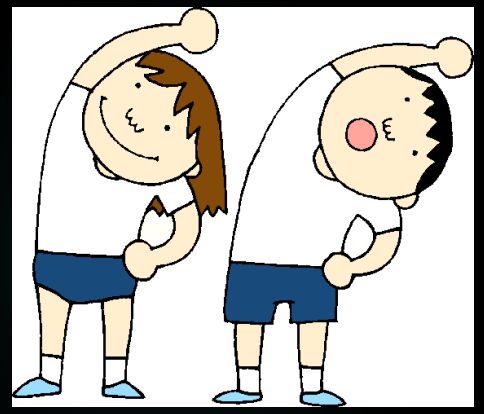




- Attendance sheet
- Stand up and stretch
- Take a bio-break
- Text message
- Web-surf
- Respond to email
- Talk with classmates
- Reflect on what was presented in class









Short Break



