

EECE 2750: Enabling Engineering
Department of Electrical and Computer Engineering
Northeastern University

Syllabus

Course Description: Students develop a proposal for a design project that uses engineering technologies to improve the lives of individuals with cognitive or physical disabilities. Project groups work with end users and caregivers at local nursing homes and special education schools to assess a specific need, research potential solutions, and develop a detailed proposal for a project. Project groups are matched with product design mentors who guide groups through the design process. Lectures cover relevant topics including surveys of specific physical and cognitive disabilities, and the applicable engineering technologies.

4 credit hours, no prerequisites. Not open to seniors in the College of Engineering.

Requirements:

1. Learn about a specific need by meeting with end users and caregivers
2. Meet regularly with course instructor
3. Meet regularly with design mentor
4. Write a detailed project proposal, including existing and competing solutions, related work, specification, design overview, parts, and design schedule
5. Give an oral presentation describing proposal

Course Outcomes: In this course, students will

1. Learn about cognitive and physical disabilities
2. Learn about engineering technologies that help those with disabilities
3. Work productively with an interdisciplinary group
4. Define and research a novel project topic
5. Write a convincing proposal that is technically sound and stylistically and grammatically correct
6. Give a convincing, well-prepared and technically sound oral presentation

Lecture Topics:

- Speech and language disorders
- Hearing disorders
- Autism spectrum disorders
- Mobility impairment
- Project leadership and group dynamics
- Intellectual property and licensing
- Medical informatics

Sample Projects:

- **iCRAFT:** Robotic feeding arm controlled by eye-tracking, used to feed a paraplegic individual.
- **Touchscreen Guard:** iPad templates used to help developmentally delayed children use a tablet more effectively.
- **Mounting System:** Bracket assembly that attaches a communication device to exercise equipment, for an individual with multiple sclerosis.
- **Sleep Tracker:** Device that tracks sleep patterns of patients in a nursing home to monitor sleep disorders.
- **Automatic Hair Washer:** Device that automatically washes someone's hair if they are unable to do it themselves.
- **Reducing Medical Errors:** Develop technologies to prevent nurses from making mistakes when passing medication at small nursing homes.
- **Memory Assistive Glasses:** Uses Google Glasses to identify people, for individuals with memory impairment.
- **Prompting System:** System that gives reminders and instructors to autistic individuals who have trouble completing tasks independently.