ENGR 297/497: Vertically Integrated Projects

HuskyADAPT: Accessible Design & Play Technology

University of Washington, Syllabus 2017-2018

1 Course Description

This course operates in conjunction with the University of Washington Vertically-Integrated Projects (VIP) Program, which supports **hands-on, project-based, research and exploration**. The VIP Program operates in a research and development context, with teams of students and faculty working on real-world projects. Students that participate in VIP earn academic credit for their participation in design efforts. This course focuses on examining multiple conceptualizations of disability, and engaging local community members with disabilities and their allies as co-designers and needs experts in design projects centered on empowerment, independence, and community participation.

The teams are:

- Multidisciplinary - drawing students from all disciplines on campus;
- Vertically-integrated - maintaining a mix of sophomores through PhD students each quarter;
- Long-term - each undergraduate student may participate in a project for up to three years and each graduate student may participate for the duration of their graduate career.

The continuity, technical depth, and disciplinary breadth of these teams are intended to:

- Provide the time and context necessary for students to learn and practice many different professional skills, make substantial technical contributions to the project, and experience many different roles on a large, multidisciplinary design/discovery team.
- Support long-term interaction between the graduate and undergraduate students on the team. The graduate students mentor the undergraduates as they work on the design/discovery projects embedded in the graduate students' research.
- Enable the completion of large-scale design/discovery projects that are of significant benefit to faculty members' research programs.
- Infuse introductory concepts of disability studies and inclusive design into engineering coursework and projects.
- Make connections with local disability communities and empower individuals with disabilities as co-designers and course consultants.

Additional information regarding VIP at UW can be found at http://vip.uw.edu/.

The UW VIP course sequence consists of ENGR 297 and 497. ENGR 297 is intended for lower division students, and ENGR 497 is intended for upper division students, specifically students in a declared major and enrolled in upper division courses within that major. ENGR 297 and ENGR 497 students, faculty, and supporting graduate students work collaboratively on VIP teams. ENGR 497 provides advanced project-based, design and exploration experiences for upper division students. Through this class, students will take on leadership roles and mentor participating lower division students, while engaging with faculty and graduate students.

2 COURSE INFORMATION

2.1 COURSE INFORMATION

- **Wednesdays from 3:30 – 4:50pm**
- **Engineering in Health Workshop (Engineering Annex)**
- 2:30-3:20pm students also have the choice to participate in:
    - CS&E490D Introduction to Accessible Technology and Participatory Design Seminar
    - The class space will also be open for team meetings and design work
- *We will use Canvas for forums, course management, and assignments*

3 LEARNING OUTCOMES

The learning outcomes of this course include (based on outcomes from ABET criteria[1]) an ability to:

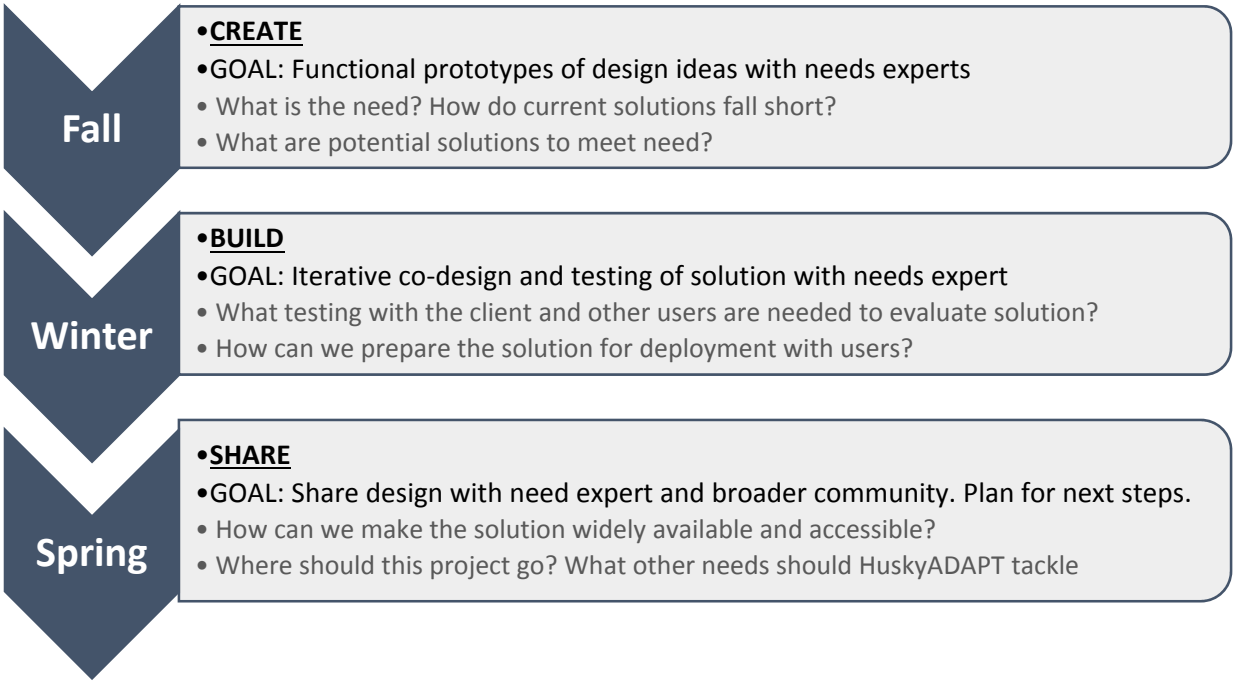
- Lead and contribute to a multidisciplinary team
- Communicate effectively
- Identify, formulate, and solve engineering problems
- Design a system, component, or process to meet desired needs within realistic constraints
- Execute experiments and other tests, including analyzing and interpreting data
- Use the techniques, skills, and modern engineering tools necessary for engineering practice

Additional learning outcomes include:

- Follow participatory design best practices
- Describe the history of people with disabilities in the US, including social, environmental, and design barriers faced
- Understand introductory principles of disability studies and how they relate to engineering practice
- Engage in and evaluate the co-design process with community members with disabilities
- Identify the principles of inclusive design and how they benefit diverse communities
- Devise an action plan to promote inclusivity and accessibility in engineering practice

[1] *Criteria for Accrediting Engineering Programs, 2015-2016* [Online]. Available: http://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2015-2016/#outcomes

4 SCHEDULE



VIP PHILOSIPHY: STUDENT-LED DESIGN & INNOVATION

Each design team is responsible for setting their schedule and plan of action for each quarter. Make sure you set aside the time in your schedule to dedicate to this project, your team, and your needs expert. In our experience, ***going deep*** *on a project provides more learning and rewards than working on a large number of projects. Use this experience to really test and develop your need-finding, design, fabrication, teamwork, and communication skills.*

Each week teams are expected to give a summary of their progress including achievements, challenges, and next steps. These projects will go as far as YOU decide to take them. The teaching team and UW community are here to offer as much support and encouragement as possible towards your project. Please let us know how we can best support you to find the resources required to tackle your design challenge.

We recommend that each team maintain a website and accompanying google drive folder to document their progress, challenges, and activities. Use this as a place to share your work with others and reach out to a broader community.

KEY DATES & MILESTONES

At each presentation teams will also submit their design notebooks for review and complete peer reviews.

October 4: Team Formation
November 8: Mid-Quarter Presentations (submit design notebooks)
December 14 at 6pm: Fall Quarter Design Review (clients, teaching team, and community experts)
January 10: Submit Winter Quarter Goals & Timeline
February 7: Mid-Quarter Presentations (submit design notebooks)
March 14: Practice Presentations
March 28: HuskyADAPT Design Showcase
May 2: Final team reports due with recommended plan for deployment or project continuation

5 GRADING

Grading within VIP differs from that of typical courses that include exams, quizzes, and homework assignments. VIP grading is based on **documentation, personal accomplishments and contributions**, and teamwork. Additionally, VIP projects are executed as multidisciplinary teams that include underclassmen, upperclassmen, and graduate students. Expectations regarding the contributions and performance of students is related to class standing, with higher expectations for students with higher class standing.

VIPs seek to create long-term design and exploration experiences for students. Consequently, students **must enroll in VIP courses for a minimum of two quarters with the same VIP team**, in order to receive credit. An in progress grade ("N") will be assigned at the conclusion of a student's first quarter in VIP. This in progress grade will be replaced by a letter grade at the conclusion of the student's second quarter on a VIP team. After the first quarter on a given VIP team, grades will be assigned at the end of each quarter, similar to other classes.

Table *1* contains the **grading rubric** for ENGR 497 students, which reflects the expectations for upperclassmen within VIP. Performance assessments will be performed based on the rubric in **Table *1*** at mid-quarter and the end of quarter by the instructor, in conjunction with supporting graduate students and VIP staff. The mid-quarter performance assessments are considered advisory, and the end-of-quarter performance assessments will affect grading.

Table 1. Grading rubric

Component	Weighting
Documentation and records • Design notebook • Website and online documentation • Code repository (e.g. SVN), if applicable • Presentations • Weekly reports	33%
Personal accomplishments and contributions • Project planning and execution, including development and delegation of tasks • Performance of assigned tasks and contributions to project • Pursuit of knowledge necessary for project • Advancement of the learning of others • Contribution to the technical progress of the team	33%
Teamwork and interaction • Organization and leadership in team meetings • Development of and contribution to team goals, including the management of progress toward goals • Coordination of activities with other team members and needs expert • Providing mentorship to less experienced students • Team presentations • Peer evaluations	33%

5.1 DOCUMENTATION

Documentation plays a significant role in the performance assessment process, as the documentation created by a student will serve as the primary record for the work completed. Documentation includes (1) individual design notebooks and (2) online documentation of team design process.

5.1.1 Design Notebook

All students are required to maintain a design notebook. The design notebook will be one of the primary mechanisms for demonstrating completed work. The design notebook is the record of an individual's design process and should not be collaborative. Design notebook content should be entered when work is performed, such that entries are in chronological order, with dated entries. **Table *2*** contains a summary of the design notebook requirements.

5.1.2 Team Website

Teams will be expected to maintain a website that will (1) track progress through the design process, (2) document weekly updates, (3) serve as a repository of useful resources for your project, and (4) eventually highlight your final designs (including instruction manuals, design files, and other documentation). Websites will be on https://pages.github.com/

5.1.3 Presentations

Mid-quarter and final presentations should be submitted on Canvas

5.2 PARTICIPATION

Students are responsible for attending and participating in team and sub-team meetings. Students should inform the instructor and/or affected teammates prior to any absences. If a student misses a meeting, the student is still responsible for knowing what occurred during the meeting (discussing with team members, reviewing meeting minutes, etc.). An excused absence does not relieve the student of responsibility, including action items.

5.3 PEER EVALUATION

Students will review and be reviewed by their teammates through a peer review process. All students are required to perform peer evaluations at mid-quarter and the end of the quarter. Failure to complete the peer evaluations will result in a full letter grade deduction. Late peer review submissions will not be accepted. The peer evaluations will focus on contribution, communication, and leadership. The peer evaluations will be filled out and submitted via Canvas.

Table 2. Design notebook requirements

Feature	Requirement
General	• notebook should be bound notebook without removable pages • entries should be in ink • pages should be numbered, signed, and dated

Content	• meeting notes:
	  o summary of salient design decisions and open design questions
	  o check-boxes for action items
	  o deadlines for sub- team/team
	• technical notes:
	  o design notes and decisions
	  o diagrams
	  o copies of code written or pointers to code repository
	  o records of important websites
	  o your ideas, even if half-baked
	• brief reflections:
	  o your understanding of disability and previous experiences with individuals with disabilities
	  o your attitudes toward the project and how it shifts over time
	  o your attitudes toward disability and how it shifts over time
	• to do list:
	  o check-boxes for action items
	  o dated completed items

Usability	• notebook should be legible and organized, with intelligible technical and meeting notes • other individuals should be able to use your design notebook to understand your design process
Identification	• outer cover should include author's name and project's name • author's and team's contact information should be included on inner or outer cover
Content order	• all entries should be in chronological order, without skipping pages
Editing previous entries	• errors should be crossed out with an X or a single line, such that the original entry is still legible • do not erase or remove content
Electronically generated content (figures, code, etc.)	• electronically generated content can be printed and then taped into notebook • alternatively, pointers to electronically generated content can be used, if content can be uniquely identified • if pointers used, consideration should be given to whether or not content will change after notebook entry

6 STUDENT CONDUCT

Similar to all classes at UW, student conduct is governed by the Student Conduct Code (Washington Administrative Code 478-120, available at http://www.washington.edu/admin/rules/policies/WAC/478-120TOC.html). The Student Conduct Code prohibits all cheating and plagiarism, which includes misrepresenting work. Within VIP, you must not represent the work of others, whether a teammate or external entity, as your own. The appropriate references and citations should be included in your design notebook, programming code, presentations, and other deliverables.

All students are expected to conduct themselves with professionalism and contribute to a positive work environment. Professional conduct includes attending meetings on time, contributing to meetings and tasks, and acting with integrity.

7 ACCOMMODATIONS

UW provides accommodations to students with disabilities through the Disability Services Office (DSO) (additional information at http://www.washington.edu/admin/dso/). If you have a disability or think you may have a disability, you are encouraged to seek the appropriate support and accommodation by contacting the DSO. Disabilities include "invisible disabilities," such as learning disabilities, chronic health problems, or mental health conditions. Modifications of course expectations and requirements must be made through the DSO.