Course Syllabus: ENG 177 –GFX Projects: Toy Design and Engineering

Fall 2024

Credit Hours: 2

Meeting Location: 2320 Digital Computer Laboratory (DCL)

Meeting days and times: Monday & Wednesday, 9:30 am-10:50 am, August 26 – December 11.

COURSE DESCRIPTION

The GFX POETS Scholars course is an exciting introduction to engineering design project management and the human centered design approach. Students will work in small teams on an engineering design project focused on creating and building playful products/services while working with K-5 students at local schools. Projects can be based on the interests of the group. This course will provide the opportunity for teamwork, project management, creativity, invention, and many fun outcomes. The focus of this course is to explore the challenges at the interface of engineering design, and most importantly the end-user. In addition to working on their projects, each team will gain skills in empathic engineering and human centered design. The expectation is that you will gain professional skills and experiences in communication, teamwork, collaboration, project management, project execution, and project oversight.

SUCCESS IN THE COURSE

Learning is a proactive process that requires engagement from both student and instructor. You are expected to work hard and contribute effort to your group's project. We as instructors will engage with teams and help you think through problems they are facing. We all will treat each other as colleagues with the goal of creating an environment where hard work, teamwork, and shared learning can thrive.

To reinforce the attitude that you are engineers in training, the structure of the classroom and teaching method will reflect that of a professional product or service development group. Concepts will be taught through small and large group discussions. Skill training will largely be done through individual or small group instruction and interaction.

COURSE OBJECTIVES COURSE GOALS and OUTCOMES

You will gain the following benefits:

- Skills and tools to help structure, define, and execute a project
- Mentorship
- Ability and experience in project planning, project management, communication, and their importance to the design process
- Understand the challenges of emphatic engineering and the useful framework of design thinking
- Experience in teamwork and collaboration

Expected outcomes from this class are:

- Enhanced verbal and written communication skills with an emphasis on how to convey ideas to others
- Hands-on experience in creating prototypes for testing and communication
- General management skills to ensure successful completion of a project

COURSE DELIVERABLES AND EVALUATION

Throughout the semester students and teams will be given feedback on both their underlying design process and their project deliverables. Course grading will be based on both the journey and the destination. Students who exhibit thorough exploration of the design process, contribute strongly to the class, provide value as a team player, and commit to personal growth as a design thinker, can expect to do very well.

Toy Industry Review Report	20%
User Interviews	15%
Evaluation Research	15%
Reflective Essay	10%

Outreach Local Schools	20%
Poster	10%
Presentation	10%

INSTRUCTORS

Joe Bradley, jabradly@illinois.edu, 2242 Everitt Laboratory

TEACHING ASSISTANTS

Helen Chang, helenhc2@illinois.edu

COURSE ASSIGNMENT DESCRIPTIONS AND REQUIREMENTS

Toy Industry Review Report (Team)

In this assignment, you will review toy industry data and reports and provide a 2-3 pages summary report. In this summary report, please discuss the size of the toy market, the categories of types of toys, leading toy companies, top selling toys, and any other information you consider valuable.

Choose 1 toy for $50.00 or less for purchase. You will discuss the toy in class

User Interviews (Team)

In this assignment, you will document the key takeaways from your interviews with the potential end-users (e.g., students, teachers, parents). You should not simply transcribe the discussion of your interview but to critically think about what the user was saying and think through how this might influence your future solution.

Concept Evaluation Research (Team)

Getting a sense of whether your solution is important to prototype and evaluate. Evaluating a prototype is important for gathering learnings. By putting your ideas out into the world, you will gather important feedback and insights on how to improve your designs. By doing this quickly through rapid prototyping, you are able to pivot and make critical changes before you've spent too much time with a particular design. In this assignment, you will turn in notes from each evaluation with 5 – 10 key points from the user. Then describe what aspects of your prototype you will keep, change, and remove. You will do this for each concept evaluation.

Outreach Local Schools (Team)

Visit and work with students on design concepts and prototypes for toys. Discuss any type of engineering and science at play in your particular toy design.

Reflective Essay - 1 – (Individual)

In this assignment, you will discuss what you hope to experience and learn in the course. Are there anything you would like to be included in the course.

Reflective Essay - 2 – (Individual)

In this assignment, you will develop a personal essay on your learning in the course. You should discuss some of the things that you have learned. You should also discuss how you think the materials and content discussed in the class will affect your studies at Illinois and your future career as an engineer. Discuss the outreach experience.

Project Presentation (Team)

The project presentation should tell a story about your concept: who you talked to, what your insights were, results of brainstorming, feedback on early prototypes, etc. The objective is to showcase the process you used to arrive at your current concept and not just the concept, product, or solution.

Poster (Team)

Your team will submit a final poster. The final report should tell a story about your concept: who you talked to, what your insights were, results of brainstorming, feedback on early prototypes, etc. The objective is to showcase the process you used to arrive at your final concept and not just the final concept, product, or solution

Accommodations for Disabilities:

To obtain disability-related accommodations for this class, students with disabilities are advised to contact the course instructor and the Division of Disability Resources and Educational Services (DRES) as soon as possible. Please contact the instructor after class, during regularly posted office hours, by phone, or by email to discuss your needs. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to disability@uiuc.edu.

Appreciation for and Utilization of Diversity:

We value the diversity represented by the participants in this course. Our diversity is a primary source of ideas and perspectives, and you work in project teams in this course to practice the use of that diversity.

Ethics and Integrity:

We expect you to uphold the highest ethical standards, to be honest, and to practice academic integrity. This includes doing original work and citing sources, including the work of students. Please give special care to prepare high-quality submissions with proper grammar and spelling.

CLASS SCHEDULE

Class	Topic	Lab Activity	End of Lab Milestones	Assignment Given	Assignment Due (on Compass by 8:00am)
1 8/26 (M)	**Course Introduction**	Learn about student interest in the course	General project discussion	Reflection Essay -1	
2 8/28 (W)	**Design Sprint**	A hands on run through of the human-centered design approach.	Get experience applying the human centered design approach		
3 9/2 (M)	**No Class (Holiday)**				
4 9/4 (W)	**What is Human Centered Design?**	Introduction to the human centered design approach			Submit Reflection Essay -1
5 9/9 (M)	**Toy Play & Review**	Assess play value and fun toys	Get experience applying the human centered design approach	As a team choose a toy to discuss in class	
6 9/11	**How Do I Interview Users?**	How to conduct user interviews	Plan user research Identify specific times and places to speak with users	Plan to interview 3-4 users [Interview packet]	

(W)				on Compass] School engagement	
7 9/16 (M)	**Addressing Initial Assumptions.** **Interview/ Observation Reflection + Assessment**				
8 9/18 (W)	**Toy Design and Classification**			Prepare to discuss your interviews in class	Discuss your toy that was purchased during in-class session.
9 9/23 (M)	**Downloading/ Documentation**	Organizing data gathered from interviews into a format that leads to successful synthesis	Structured organization of data from interviews		Submit User Interviews
10 9/25 (W)	**Identifying Insights & Framing Opportunity Areas with HMWs**	Synthesizing data from interviews into a design opportunity for ideation			
11 9/30 (M)	**Introduction to Making Skills** **Safety Lecture –**	Safety skills introduction			

	Dr. Edward Chainani				
12 10/2 (W)	**Visit Franklin**				
13 10/7 (M)	**Brainstorming + Narrowing Ideas**	Ideating concepts based on an identified design opportunity and prioritizing which to move forward with	Generate 10+ potential solutions Narrow to one concept to prototype		
14 10/9 (W)	**Visit Franklin**				
15 10/14 (M)	**Concept Design for new prototype (higher fidelity)**	Layout concept and functional diagram for prototype. Order components, Design layout	Start outline design and build of materials	Plan to have prototype concepts evaluated	
16 10/16 (W)	**Build Day or** **Visit Franklin**	Working on Prototype			
17 10/21 (M)	**Build Day**	Working on Prototype			Submit Concept Evaluation

18 10/23 (W)	**Build Day and/or** **Visit Franklin**	Working on Prototype			
19 10/28 (M)	**Build Day**	Working on Prototype			
20 10/30 (W)	**Build Day and/or** **Visit Franklin**	Working on Prototype			
21 11/4 (M)	**Build Day**	Working on Prototype			
22 11/6 (W)	**Build Day and/or** **Visit Franklin**	Working on Prototype		Evaluative Feedback forms	
23 11/11 (M)	**Build Day**	Working on Prototype			Submit Evaluative Feedback forms
24 11/13	**Build Day and/or** **Visit Franklin**	Working on Prototype			

(W)				
25 11/18 (M)	**Build Day**	Working on Prototype		
26 11/20 (W)	**Build Day and/or** **Visit Franklin**	Working on Prototype		
27 11/25 (M)	**No Class Meeting HOLIDAY**			
28 11/27 (W)	**No Class Meeting HOLIDAY**			
29 12/2 (M)	**Build Day**	Working on Prototype		
30 12/4 (W)	**Build Day and/or** **Visit Franklin**	Working on Prototype		

31 12/9 (M)	**Project Presentations**	Presentation and Project demonstration	• Project demonstrations show HCD process was utilized		• Submit Presentation Slides
32 12/11 (W)	**Project Presentation**	Presentation and Project demonstration	• Project demonstrations show HCD process was utilized		• Submit Poster (Team) • Submit Reflection Essay - 2 (Individual)