

**COURSE IDENTIFICATION****Course Title:** Design Thinking**Description and Prerequisites**

This course will provide students with a foundational knowledge and strategies in a variety of creative design practices and how these intersect with and enhance approaches to research. Emphasis will be placed on the relationship between innovation, creativity, collaboration, and communication in conducting research and finding ways to utilize design to address real-world problems.

**Textbooks and Required Materials**

Texts will be provided to students in the form of PDF documents excerpted from published sources, online resources, and lecture notes. Students may need to find and/or purchase materials specific to their group project but this is not determinable in advance.

**COURSE OUTCOMES & OBJECTIVES**

<b>Outcomes</b>	<b>Objectives</b>
<b>Knowledge: What students should know</b>	
Understand the history, current issues, and direction of the artistic discipline	Students will gain an understanding of contemporary applications of research and design.
Place works in the historical, cultural, and stylistic contexts of the artistic discipline	Students will relate the objects they create to precedents and industry examples.
Use the technology and equipment of the artistic discipline	Students will use relevant equipment and technology in the creation of course projects.
<b>Skills: What students should be able to do</b>	
Use the elements and principles of art to create artworks in the artistic discipline	Students will explore elements and principles of design as they create course projects.
Create artwork that demonstrates perceptual acuity, conceptual understanding, and technical skill	Student work will demonstrate relevant skill and accuracy.
Analyze and evaluate works of art in the artistic discipline	Students will engage in peer and self-critique of their works.
<b>Synthesis: How students will combine knowledge and skill to demonstrate learning</b>	
Produce artworks demonstrating technical skill and disciplinary knowledge	Students will produce works demonstrating relevant skill and technique.
Use knowledge of art and disciplinary vocabulary to analyze artworks	Students will use appropriate vocabulary in their written work and self-reflections.
Participate in critiques of own work and work of others	Students will participate in individual and group critique of projects.

CLASS SCHEDULE		
Week – Topic	Lesson	Assignment
1. The Deep Dive: the intersection of art, design, and business	<ul style="list-style-type: none"> <li>• Video: The Deep Dive (IDEO YouTube clip) [1 hr] <a href="http://www.youtube.com/watch?v=JkHOxyafGpE">http://www.youtube.com/watch?v=JkHOxyafGpE</a></li> <li>• Discuss: How to design breakthrough inventions</li> <li>• <a href="http://www.youtube.com/watch?v=9TlspgTbLM">http://www.youtube.com/watch?v=9TlspgTbLM</a></li> <li>• CBS news story about IDEO [15 min]</li> <li>• Discuss: How does this apply to art and design practice?</li> <li>• Distribute sketch assignment (Rube Goldberg scenario—student must create a sketch to illustrate—included in Appendices)</li> </ul>	<p>Journal Entry 1: reflect on the day's lesson and discussion, focusing on implications for your career aspirations.</p> <p>Sketch Assignment (due next class period)</p>
2. Virtual Crash Course (in Design Thinking)	<p>Stanford d-school video—class participates along with the film on a design challenge: re-designing the gift-giving experience [90 min activity] <a href="http://dschool.stanford.edu/dgift/">http://dschool.stanford.edu/dgift/</a></p>	<p>Journal Entry 2: what was your experience in class today? How can this activity apply to your artwork? To your life? To your future career?</p>
3. Traditional Research Methodologies-	<ul style="list-style-type: none"> <li>• <u>Lecture</u>: Instructor presents an overview of each of the following research methodologies <ul style="list-style-type: none"> <li>○ Quantitative</li> <li>○ Qualitative</li> <li>○ Historical</li> </ul> </li> <li>• <u>Discuss</u>: Have you used any or all of these before? If so, when? How might they relate to the arts? How might the arts enhance or support research in other academic areas?</li> <li>• <u>Debate</u>: Should art be used to enhance research in a non-arts discipline (Divide students into two teams, pro and con)</li> </ul>	<p>Journal Entry 3: in what ways can you envision using each of the research methodologies we've studied? How does this differ from your prior understanding of research?</p>
4. Non-Traditional Research Methodologies	<ul style="list-style-type: none"> <li>• <u>Lecture</u>: Instructor presents an overview of each of the following research methodologies <ul style="list-style-type: none"> <li>○ Studio-Based Inquiry</li> <li>○ Action Research</li> </ul> </li> <li>• <u>Discuss</u>: What are the similarities and differences between these two methodologies? Why do you suppose arts practitioners might prefer these approaches to research?</li> </ul>	<p>Journal Entry 4: can you imagine using these research methodologies? In what ways might they be either more or less useful than traditional research methodologies? In what ways can you think of that they might be applied to your field of study? (Example: action research is used in business marketing, education,</p>

	<ul style="list-style-type: none"> <li>• <u>Debate</u>: Does a product stand alone as evidence of research? (Divide students into teams, pro and con)</li> </ul>	<p>and nursing; studio-based research is applicable to engineering and industrial design)</p>
<p>5. Wicked Problems</p>	<ul style="list-style-type: none"> <li>• <u>Lecture</u>: What is a “wicked problem”? <a href="http://www.ssireview.org/articles/entry/wicked_problems_problems_worth_solving">http://www.ssireview.org/articles/entry/wicked_problems_problems_worth_solving</a> (can download free online version of the book <i>Wicked Problems: Problems Worth Solving</i> by Jon Kolko)</li> <li>• <u>Discuss</u>:             <ul style="list-style-type: none"> <li>○ How do research methodologies and design thinking converge when addressing a wicked problem?</li> <li>○ What traditional methodologies are useful?</li> <li>○ What non-traditional methodologies are useful?</li> <li>○ Can the solution to a wicked problem also be an entrepreneurial opportunity?</li> </ul> </li> <li>• <u>Activity</u>: Divide students into teams of 3. Teams begin brainstorming a wicked problem they’ll address during the next 10 weeks.</li> </ul>	<p>Journal Entry 5: Part I: Generate a list of at least 5 genuine problems for which you think that a multi-disciplinary solution could be achieved. (may be big or small) Part II: Identify at least 5 opportunities for innovation</p>
<p>6. Fail Early and Often Bias Towards Action Prototyping</p>	<ul style="list-style-type: none"> <li>• <u>Lecture/Discussion</u> of these essential aspects of Design Thinking.</li> <li>• Work groups share ideas they generated for projects. Groups meet with instructor to discuss their ideas. Groups assign tasks to members in preparation for the next week (gathering materials, searching for information...).</li> <li>• Intro project: Groups design a pencil.             <ul style="list-style-type: none"> <li>○ Determine the amount of time you have between now and Mid-Term when the pencils must be distributed to your classmates (manufacture 1 per person in the class)</li> <li>○ Plan to spend 1/3 of your time brainstorming three possible ideas</li> <li>○ Spend 1/3 of your time developing the three ideas in order to choose one to manufacture</li> <li>○ Spend the last 1/3 of the time on manufacturing</li> <li>○ Agree on a schedule of when your</li> </ul> </li> </ul>	<p>Journal Entry 6: reflect on today’s group interactions. What went well? What could have been better? What role did you play? How do you feel about the project? How do you plan to accomplish the task you’ve taken on?</p>

	<p>group will meet over the next 2 weeks to complete this assignment</p> <ul style="list-style-type: none"> <li>○ Produce a 5-minute video outlining the strategies of your project</li> </ul>	
7. Project Planning Project Management	<ul style="list-style-type: none"> <li>● Lecture: Basics of Project Management</li> <li>● Groups share the information or materials they've brought to class and begin creating their projects.</li> <li>● Discussion: whole-group—how does planning and management fit in with design thinking?</li> <li>● Discussion: small-group—how can you create an actionable plan for your group?</li> </ul>	Journal Entry 7: what is your approach to a project: to form a plan and stick to it, or to take an organic approach? Which aspects of what you learned today might be beneficial to your academic pursuits? To your eventual career?
8. Mid-Term	Mid-Term project check: groups prepare a 10-minute presentation describing their progress and explain what remains to be done. Peers provide feedback and suggestions. Teams also present their 5-minute video and distribute the pencils they manufactured.	Journal Entry 8: Which project was the most interesting? The most successful? The least interesting? The least likely to succeed?
9. Prototyping	<ul style="list-style-type: none"> <li>● Lecture: Thinking by Doing—Bias towards action, Part II</li> <li>● Groups make a materials list for the prototypes they'll construct, then brainstorm how and where they'll find supplies.</li> </ul>	Journal Entry 9 Reflect on today's work experience. What's going well? What's not?
10. Work Day	Group Work Day	Journal Entry 10: Reflect on today's work experience. What's going well? What's not?
11. Why? How? What?	<ul style="list-style-type: none"> <li>● Lecture: why Apple is successful by beginning with Why.</li> <li>● Group Task: formulate a Why? How? What? Statement for your project.</li> <li>● Last 20 minutes of class—each group has 3 minutes to share their Why? How? What? Statements.</li> </ul>	Journal Entry 11: How can you apply the structure of Why-How-What outside of this class?
12. Prototype Testing	Present prototypes to the class. If possible, the class can move into a common area frequented by many students (dining facility, etc...) and present the prototypes to students who are not in the class, gathering data and feedback that will be incorporated into the product. If the product is not suitable to that setting, it will be the group's responsibility to find a suitable venue for field testing.	Journal Entry 12: Reflect on the audience reaction to your group's prototype. What was successful? What needs to change?
13. Work Day	Group Work Day	Final Paper: write a 1 to 3 page summary and reflection of your experience in this class. Refer to

		your weekly journal entries for ideas. What was the most important thing you learned? What was your greatest success? What failure taught you the most? How will you apply design thinking to your studies and eventual career?
14. Final I	Final presentations Part I Presentations should be 10-15 minutes long. These must include: <ul style="list-style-type: none"> <li>• A multimedia presentation</li> <li>• A finished product demonstration</li> <li>• An explanation of the problem that the product can solve</li> <li>• An overview of what you learned when you field-tested the prototype</li> <li>• The human impact of the product</li> <li>• A description of each group member's role in the process</li> </ul>	n/a
15. Final II	Final presentations Part II	n/a

**ASSIGNMENT & ASSESSMENTS**

Item	Due	Weight
12 Journal Entries	Each journal is due the first day of class during the following week. Ex: Journal 2 is due the first day of Week 3	25% (2% each x 12 + 1% for Rube Goldberg sketch)
Group Project 1: Pencils	Mid-term	5%
Group Project 2: Wicked Problem	Weekly	15%
Group Presentation	Weeks 14 or 15	5%
Class Participation	Throughout course	30%
Final Paper	Week 14	20%
Total		100%

**Attachments-1****Written directions for assignments****Journal and Sketchbook (25% of final grade)**

The journal and sketchbook represent a significant portion of your grade in this class because the real WORK of the course occurs through your thought processes and personal reflections. This is an ongoing process, so your recordkeeping of this learning through visual and textual means is very significant.

- Entries have a date and a title
- Entries are written legibly
- Entries must clearly connect to course content or class discussions
- Entries demonstrate connection between the student's life experiences and course content
- Entries demonstrate personal growth, learning and/or reflection
- Entries are of high quality and demonstrate thought and effort
- Journals will be turned in weekly, the first day of class during the following week. For example, Journal 2 is due the first day of Week 3.

**Class Participation (30% of final grade)**

- This is an experiential, hands-on course. Therefore, your active participation is required at all times
- Students must be prepared for class and ready to engage in the day's discussions and activities
- You should be prepared to share your ideas and opinions during class discussions.
- You should demonstrate active listening through your facial expressions and body language
- You should exhibit willingness to volunteer your ideas and opinions, and enthusiasm for class activities.

**Group Project 1: Pencils (5%)**

- Groups of students will design and build a pencil
- You must manufacture enough pencils for the entire class, and the instructor
- Your group must work as a team to accomplish this task
- Calculate the amount of actual time you have between the assignment of the project and mid-term, when you'll present your pencils. Create a schedule of times for your groups to meet over the two weeks between the assignment and presentation.
- Divide your work time into thirds:
  - 1/3 brainstorming three possible ideas
  - 1/3 developing the three ideas in order to choose the most successful one
  - 1/3 manufacturing the pencils
- Produce a 5-minute video outlining the strategies you used. This will be presented in class.

**Group Project 2: Wicked Problem (15%)**

- In the same group with whom you completed the Pencil Project, you will brainstorm and select a Wicked Problem to address. (Brainstorming and project selection takes place prior to the Pencil Project, which serves as a teambuilding warm-up)
- You will delegate tasks to prepare for your project, seeking information, gathering materials, and so on.
- Your group's tasks are set out week-by-week in the Class Schedule:

- Week 5: Lecture--Wicked Problems; Divide into teams of 3 students each; brainstorming for Final Project
- Week 6: Assign Pencil Project; Groups meet to divide preparatory tasks for Final Project
- Week 7: Groups share information gathered and begin working on Final Project
- Week 8: Present Pencil Project and progress on Final Project
- Week 9: Create materials list
- Week 10: Work day
- Week 11: Create Why? How? What? Statement for project
- Week 12: Present prototype to class; field-testing of prototypes, if appropriate
- Week 13: Work day
- Week 14-15: Final presentations (10-15 minutes each)

#### Group Presentation (5% of final grade)

- Creativity is important, but there are no specific criteria beyond the time limit, which will be strictly enforced.
- All projects must demonstrate:
  - Substantial knowledge
  - Creativity
  - Evidence of preparation and organization
- Presentations must be:
  - Of high quality
  - Clear and easy to understand
  - Engaging and interesting
- Presentations must include:
  - A multimedia presentation
  - A finished product demonstration
  - An explanation of the problem that the product can solve
  - An overview of what you learned when you field-tested the prototype
  - The human impact of the product
  - A description of each group member's role in the process

#### Final Reflection Paper (20% of final grade)

- You will write a 300-500-word paper reflecting on your experience in this class.
- The paper should address:
  - What was the most important thing you learned?
  - What was your greatest success?
  - What failure taught you the most? What was it? Why do you value this experience?
  - How will you apply design thinking to your education and/or career?

#### Rube Goldberg Contraption

##### Easy Company Tea

Rising bread (a) pushes a springed pipe (b) against a balancing board (c) forcing heavy bowling ball (d) to roll onto a board (e) forcing the spring of basketball (f) to push up on wood handle (g) on oven thermometer (h) causing oven to turn on and bake bread. Handle (g) is helped up by weight (i) which has control of the spring. Weight (i) pushes in alarm clock (j) and is set for 50 minutes. After

50 minutes alarm is rung and alarm spring pops knob (k) put on top, pushing weight (i) into air letting handle (g) swing down to turn off oven (b) and hit button (l) to let oven door (m) open, allowing bread to cool. At the same time the alarm rings, a mouse's tail (n) is freed. The mouse follows his senses to cheese (o) in trap (p). The springs of the trap hit board (q), causing it to spring up and pull with handle (r) attached to stove burner (s) and turn on burner (t) heating water (u) for tea. The whistle in turn will notify baker of warm bread and tea for company.

- Make a drawing in your sketchbook of the above description. Label all parts a, b, c, etc...

Alternative:

- Search YouTube for "Rube Goldberg" and watch a few examples. Choose one and create a labeled diagram/sketch. It must have at least the same number of steps as the "Easy Company Tea" example, above.

Whichever option you choose, make a copy of your sketchbook page (on a copy machine or scan it and print it out) and bring the copy to the next class.