“Everyone designs who devises courses of action aimed at changing existing situations into preferred ones.”

— Herbert Simon, CMU professor (1949-2001) and Nobel Prize winning economist

“Design is the fundamental soul of a man-made creation that ends up expressing itself in successive outer layers.”

— Steve Jobs, genius

“Discovery consists of seeing what everybody has seen and thinking what nobody has thought.”

— Albert Szent-Gyorgyi, Nobel Prize winning biochemist and discoverer of Vitamin C

"A great many people think they are thinking when they are really rearranging their prejudices."

— William James, American philosopher and psychologist

“The best design surpasses its predecessors by using new ideas, and the best research solves problems that are not only new but worth solving. So ultimately design and research are aiming for the same destination, just approaching it from different directions.”

— Paul Graham, founder of Y Combinator

“A designer knows he’s achieved perfection not when there is nothing left to add, but when there is nothing left to take away.” (Related to the gospel of German industrial designer and Steve Jobs mentor Dieter Rams (Braun): “Weniger aber besser” = “Less but better”)

— Antoine de Saint-Exupery, author of The Little Prince

“A common mistake people make when trying to design something completely foolproof is to underestimate the ingenuity of complete fools.”

— Douglas Adams, author of Hitchhiker’s Guide to the Galaxy

“You can dream, design, create, and build the most wonderful place in the world, but it requires people to make the dream a reality.”

— Walt Disney, another genius
INSTRUCTOR
Tim Zak
Associate Teaching Professor, Heinz College
Director—Institute for Social Innovation
HBH 2110
TJZAK@ANDREW.CMU.EDU or TJZAK@HOTMAIL.COM (alternate)
Office: (412) 268-5945
Cell: (412) 735-4077

CLASS HOURS
Monday and Wednesday—HBH 1206, 10:30-11:50 a.m. (Section B4) and HBH 1202, 1:30-2:50 p.m. (Section A4)

OFFICE HOURS
By appointment.

I realize that everyone’s schedule is different so I’ll make every effort to accommodate your needs. The best bet is to call or send me an e-mail to make an appointment or, if you’re feeling lucky, just stop by my office.

Also, I’ll be happy to take questions or comments after class on a first-come, first-served basis. Finally, I welcome conversations not necessarily related to design thinking (e.g., career path, course selection) if you think that my time in the “real world” can provide another dimension to your experience at the Heinz College and/or Carnegie Mellon.

TEACHING ASSISTANT
Gurinder Gill (ggill@andrew.cmu.edu); TA hours—day/time and location TBD

ABOUT THIS COURSE

The word “design” has traditionally been used to describe the visual aesthetics of objects such as consumer products, architecture, and fashion. Over time, the discipline of design expanded to include not only the shaping of things but also the ways that people interact with systems, services, and organizations.

In 2008, Tim Brown, CEO of IDEO, a Silicon Valley design firm famous for designing the first computer mouse for Apple, wrote an article for the Harvard Business Review (re-)introducing into the lexicon a further expansion of the design discipline—what he called “design thinking” [“reintroducing” since a book called Design Thinking, written by a Harvard urban planning professor, was published in 1987…there is rarely anything truly new under the sun].

Design Thinking is a problem solving methodology especially well suited for investigating ill-defined problems. It uses methods derived from the discipline of design to match people’s needs with what is feasible and what a viable organizational strategy can convert into customer/stakeholder value in a financially sustainable way.

It was initially proposed as a way for corporations to more quickly, creatively, and effectively develop new offerings but has since been further adapted to address issues in the public and social sectors as well.
This course provides an introduction to design thinking for budding business titans, policy makers, social innovators and anyone else interested in learning more about an approach that can be applied to a variety of “wicked” problems.

After presenting the history and context of design thinking from a variety of perspectives, we'll take a “deep dive” into the discipline using a very structured and rigorously tested step-by-step methodology used in graduate academic, start-up, and large organization settings. By focusing on four questions and ten key activities, and completing pre-defined templates and exercises along the way, we'll get to the core of the design thinker's toolkit and its practical applications. In addition, topics ranging from psychology and brain science to visual thinking and drawing pictures for impact to the essence of storytelling will be included at relevant times to create what I hope is a class unlike any other of its kind in the world.

This learning will be supported through lectures, discussions, readings, in-class exercises, and a series of formal and informal design reviews that encourage reflection on students’ process and their insights. Success in the course will depend on the amount of time and degree of involvement observing, listening, analyzing, storytelling, and otherwise engaging key stakeholders to develop and prototype meaningful and transformative designs for selected products, services, and other relevant objectives.

Here’s our challenge for the mini-semester: This is the first time design thinking is being taught at the Heinz College with the materials, course structure, and deliverables represented in this syllabus. It is intentionally about 80-90% “complete”, not only because it’s new but because I intend to always have it be “mostly done” to allow room for adaptation and co-design with each student cohort. If this degree of ambiguity makes you uncomfortable, you should reconsider whether this is the right class for you. Recognizing that we live in a world of uncertainty where there are rarely “right answers” is at the core of design thinking.

In addition, the range of topics and applications related to design thinking is vast. Therefore, this course will act as an introduction to the key concepts, methods, and general uses of design thinking in the public, private, and social sectors. It is directed at future problem solvers, and those who will be leading and overseeing their efforts. In short, I hope that this course will arm you with a set of topics, tools, and techniques that are both relevant and impactful to your career plans, and potentially motivate you to learn even more about design thinking in the future.
## COURSE OBJECTIVES

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>How Assessed</th>
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<tbody>
<tr>
<td><strong>Understand</strong></td>
<td>Class participation, assignments, final project</td>
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<tr>
<td>Introduce students to a discipline—design thinking—that enhances innovation activities in terms of value creation, speed, and sustainability</td>
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<tr>
<td><strong>Build</strong></td>
<td>Class participation, assignments, final project, peer review</td>
</tr>
<tr>
<td>Strengthen students' individual and collaborative capabilities to identify problems/issues/needs, develop sound hypotheses, collect and analyze appropriate data, and develop ways to collect meaningful feedback in a real-world environment</td>
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<tr>
<td><strong>Experience</strong></td>
<td>Final project, peer review</td>
</tr>
<tr>
<td>Teach students to translate broadly defined opportunities into actionable innovation possibilities and recommendations for key stakeholders and their organizations</td>
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## COURSE MATERIALS


## (A VERY BRIEF) SAMPLE READING LIST

- Nigel Cross, *Design Thinking: Understanding How Designers Think and Work* (Bloomsbury Academic, 2011)
• Bruce Hannington and Bella Martin, *Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions* (Rockport Publishers, 2012)

• Don Norman, *The Design of Everyday Things* (Basic Books, 2013)


**O THER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES**

• Human-Centered Design Toolkit (IDEO); [https://www.ideo.com/post/design-kit](https://www.ideo.com/post/design-kit)

• Design Thinking Boot Camp Bootleg (Stanford D-School); [https://dschool.stanford.edu/resources/the-bootcamp-bootleg](https://dschool.stanford.edu/resources/the-bootcamp-bootleg)


• Design Thinking for Educators (IDEO); [https://designthinkingforeducators.com/](https://designthinkingforeducators.com/)

**C O U R S E C O N T E N T**

The course is organized into 7 modules:

• **Why Design Thinking and The Design Process** provides context and an introduction to key concepts, terminology, and structure for the course.

• **Scoping, The Design Brief and Visualization** introduces ways to clarify the scope of a project and its intent, questions to explore, target stakeholders, and establishes the importance of pictures and storytelling in the overall process.

• **Fundamentals of Ethnography and Identifying Insights** reviews how to observe users in their “natural habitat” and efficiently extract useful patterns from collected data.

• **Establishing Design Criteria and Brainstorming** shows how to develop a succinct expression of the ideal end state of a project, and deliberately generate many fresh alternatives to the status quo.

• **Concept Development and The Napkin Pitch** details how to choose the best ideas, assemble them into detailed solutions, and rationally evaluate them, as well introduce a simple, consistent format for summarizing and communicating new concepts.

• **Assumptions Testing and Prototyping** introduces a tool for surfacing key assumptions underlying the attractiveness of a new concept and using data to assess the likelihood that they are true, as well as ways to create visual manifestations of concepts.

• **Co-Creation, Learning Launches, and “So What?”** highlights ways to engage stakeholders in the development of new concepts, conduct experiments in the world quickly and inexpensively, and lead innovation in organizations.
PRE-REQUISITES
None.

REQUIRED READINGS
All readings must be completed in advance of the corresponding class session (see Tentative Course Schedule below) and concepts will be integrated into lectures and subsequent discussions. Expect “cold calling”, if required, to get things started and provide more rigor and interaction in our review of class topics. Relevant lecture notes and any other materials will be made available via Canvas prior to the lecture for that week.

COURSE REQUIREMENTS
Design thinking is an inherently collaborative process with a particular emphasis on team-centric activities. As a result, the majority of your final grade will be based on the results that your team produces and your contribution to those results with a smaller portion dedicated to solely individual work:

• **Project Templates** (30 POINTS—5 POINTS FOR EACH SUBMISSION)
  - Design Brief (Individual)
  - Design Brief (Team)
  - Design Criteria
  - Napkin Pitch
  - Key Assumptions
  - Learning Launch Design

• **Final Project Submission** (40 POINTS)

• **Team Peer Evaluation** (20 POINTS)

• **Individual Class Participation** (10 POINTS)

Teams will be randomly assigned and announced in class on Monday, March 26th. All assignments will be posted to Canvas with the file format [Name or Team].[Assignment].[File Extension]; for example “Team_1.Design_Brief.xls”.

The mean grade in the class will likely be around 3.5 (between A and B) although I am more than willing to depart from those guidelines based on extraordinary performance (in either direction) from the class. Grades in the “A range” will be reserved for students who perform exceptionally well in all aspects of the course.

Students/teams occasionally request extensions if they cannot complete their assignments due to unforeseen work commitments, family problems, illness, and so on. Assignments that are submitted after a deadline will be assessed a significant “late penalty” which could be as severe as a “0” for the assignment (my discretion). An “incomplete” grade will be given only under exceptional circumstances (poor time management is not considered an “exceptional circumstance”!), also at my discretion, and should be discussed with me before the end of the class so that appropriate paperwork can be completed.
Finally, you should note that the assigned readings for the course provide only a broad framework for the topics we will discuss. Therefore, in your assignments, you are encouraged to access other research materials, websites, data, books, articles, videos,....

**A BRIEF WORD ON PLAGIARISM AND CHEATING...**

Don’t!—no grade is worth sacrificing your personal integrity, particularly in this program! You are responsible to know and adhere to all university policies on academic integrity. The Heinz College provides a booklet on plagiarism and cheating, and the university lists all policies at [www.cmu.edu/policies/documents/Academic%20Integrity.htm](http://www.cmu.edu/policies/documents/Academic%20Integrity.htm). Please acquaint yourself with the contents.

*Any plagiarism or cheating will result in failure in the course and your case will be reported to the Associate Dean who may decide to take further action.*

**COURSE PROJECT**

Your challenge during the mini-semester is to identify a product, service, environment, process, or journey (i.e., practically anything) within Hamburg Hall that your team believes can be better, and apply the “Four Questions, Ten Tools” process introduced in *Designing For Growth* to investigate that hypothesis.

To provide structure and rigor to the effort, as well as accelerate progress, individuals and teams (as appropriate) will submit a series of design thinking templates at key junctures of investigation (see *Tentative Course Schedule* below). Templates, along with evaluation criteria, will be available on Canvas. Specific feedback will ideally be provided within one week or less to allow for thoughtful refinements and iterations.

At the conclusion of the course, teams will synthesize all of their research, activities, templates, methods, artifacts, conclusions, and any other relevant materials to represent their “journey of discovery”. At a minimum, this deliverable should incorporate the following elements:

- Statement of the design challenge and overview of the problem solving approach
- Insights based on the design research conducted
- Key themes and opportunity areas drawn from research insights
- Visualized concepts that address the opportunity areas
- A plan to make the solution concepts actionable and measurable

Submissions will be posted to Canvas and can take form in any digital format (e.g., PowerPoint, Word, Adobe) that “works” for your team.

The following standards will be used in assigning grades to final submissions:

- **A-to-A+**
  Exemplary work, which shows an especially deep understanding of the problem, displays outstanding competence in the required skills, and exhibits a comparatively high level of conceptual clarity and depth. Final submission is exceptionally clear, complete, and compelling, and displays outstanding creativity and distinctiveness.
• B+ to A-
  Some exemplary work, which shows an understanding of the problem, displays competence in the required skills, and exhibits good conceptual clarity and depth. Final submission is clear, complete, and compelling, and displays creativity and distinctiveness.

• B- to B
  Work, which meets the minimum requirements of understanding the problem and competence in required skills. Final submission is generally clear, complete, and compelling but contains meaningful deficiencies.

• C+ and below
  Adequate-to-incomplete work, which shows little to no understanding of the problem and significant-to-serious deficiencies in required skills and concepts. Final submission is not clear or compelling and clearly lacking in key areas.

Team Peer Evaluation

Undertaking any design thinking initiative is an inherently collaborative and participative process. Your ability to work with others in a wide variety of contexts is central to a successful outcome.

As a result, a meaningful portion of your final grade will be determined by your teammates and your own self-evaluation. All students will submit a peer evaluation at the end of the semester. Letter grades will be assigned in five key areas related to design thinking along with an overall grade for all team members and yourself. The average GPA of your evaluation cannot exceed 3.67. Failure to comply with this requirement will result in a reduction of your team peer evaluation grade (by an amount at my discretion).

INDIVIDUAL CLASS PARTICIPATION

“Class participation” does not entail simply answering when spoken to. However, one aspect, informed discussions, is particularly critical to the learning process and will make this class much more interesting and fun for all of us. Each student is expected to volunteer substantive comments freely. Quality (versus quantity) is important. Your score will be determined by my assessment of your relative contributions, preparation, and attendance (after missing two classes, your grade drops by a letter grade for each additional class missed unless absences are approved in advance).

In addition, participation does not have to be limited to class sessions only. If, for example, you bring a relevant magazine or online article to my attention, I’ll include that contribution towards the individual participation grade as well. I will make an honest attempt to involve every student in this process, but it is possible that I may consistently overlook a potential contributor. Please bring this to my attention.

Finally, your attitude — attendance, meeting deadlines, contributions to class discussions, dealing constructively with criticism, exhibiting a full sense of commitment to this class and your work—will be a key element in your evaluation. The grading for this part of the course could be construed as somewhat subjective and ambiguous but through our collective efforts, we can ensure that it is fair.
Classroom Etiquette

Cell phones should be turned off. If there is a situation where you need to be able to receive a call during class, you should use the “silent” mode on your phone and quietly leave the room when a call comes in.

Laptop computers are permitted to be open during class but note that it’s relatively easy to identify when students are using devices for non-class-related activities. I reserve the right to ask that laptops be closed at any time and to call on any student using a laptop in class.

I greatly appreciate students arriving on time for class and getting back from breaks. Please let me know beforehand if you must leave class early.

Be respectful of others and generally treat your conduct in this class the same way you would in any other professional situation.

Thanks in advance for your efforts to create a class environment that works for everyone!

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

If you have a disability and have an accommodations letter from the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the mini-semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu

STATEMENT OF SUPPORT FOR STUDENTS’ HEALTH AND WELL-BEING

Take care of yourself. Why? Not only will it help you cope with stress but also it’s directly correlated to higher performance, academically and in the rest of your life. So make an effort to maintain a healthy lifestyle this academic year by eating well, exercising, avoiding drugs and alcohol, getting enough sleep, and taking some time to relax.

All of us benefit from support during times of struggle. There are many helpful resources available on campus and an important part of life is learning how to ask for help. Asking for support sooner rather than later just makes good sense.

If you or anyone you know experiences any excessive academic stress, difficult life events, or feelings like anxiety or depression, I strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is available on campus to help: call 412-268-2922 or visit their website at http://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.
TENTATIVE COURSE SCHEDULE (OUR ACTUAL MILEAGE MAY VARY)

First, a caveat:
It is possible that, as we “get into” the material, I’ll want to make some modifications to the course schedule due to timing and/or content issues. My commitment is to give you enough advanced notice on modifications to sufficiently prepare.

Designing For Growth: What Is?

Week 1: Why Design Thinking and The Design Process


Article: Design Thinking: Get a Quick Overview of the History (Interaction Design Foundation, December 2017); https://www.interaction-design.org/literature/article/design-thinking-get-a-quick-overview-of-the-history

Week 2: Scoping, The Design Brief and Visualization

Text: Chapter 3: Visualization

Field Book: Step #2: Scope Your Project & Step #3: Draft Your Design Brief + pgs. 76-77

Videos: Review the 4 instructional videos associated with the book Back of the Napkin (Dan Roam); http://www.danroam.com/the-back-of-the-napkin/

PROJECT TEAMS ANNOUNCED—MONDAY, MARCH 26TH
INDIVIDUAL DESIGN BRIEF DUE—WEDNESDAY, MARCH 28TH
TEAM DESIGN BRIEF DUE—FRIDAY, MARCH 30TH

Week 3: Fundamentals of Ethnography and Identifying Insights

Text: Chapter 4: Journey Mapping, Chapter 6: Mind Mapping

Field Book: Step #4: Make Your Plans, Step #6: Identify Insights, and Tools pgs. 46-61

Article: Making Compassionate Decisions: The Role of Empathy in Decision Making (Farnam Street); https://www.fs.blog/2017/12/against-empathy/

**Designing For Growth: What If?**

**Week 4: Establishing Design Criteria and Brainstorming**

**Text:** Chapter 7: Brainstorming  
Field Book: Step #7: Establish Design Criteria, Step #8: Brainstorm Ideas  
**Article:** Better Brainstorming (Harvard Business Review, March-April 2018); [https://hbr.org/2018/03/better-brainstorming](https://hbr.org/2018/03/better-brainstorming)

**TEAM DESIGN CRITERIA DUE—MONDAY, APRIL 9TH**

**Week 5: Concept Development and The Napkin Pitch**

**Text:** Chapter 8: Concept Development  
Field Book: Step #9: Develop Concepts, Step #10: Create Some Napkin Pitches

**TEAM NAPKIN PITCH DUE—FRIDAY, APRIL 20TH**

**Designing For Growth: What Wows?**

**Week 6: Assumptions Testing and Prototyping**

**Text:** Chapter 9: Assumption Testing, Chapter 10: Rapid Prototyping  
Field Book: Step #11: Surface Key Assumptions, Step #12: Make Prototypes + pgs. 78-80

**TEAM KEY ASSUMPTIONS DUE—MONDAY, APRIL 23RD**

**Designing For Growth: What Works?**

**Week 7: Co-Creation, the Learning Launch, and the “So What?”**

**Text:** Chapter 12: Learning Launch and Section VI: Leading Growth and Innovation in Your Organization  
Field Book: Step #14: Run Your Learning Launches, Step #15: Design the On-Ramp  
**Article:** The Law of Unintended Consequences: Shakespeare, Cobra Breeding, and a Tower in Pisa (Farnam Street); [https://www.fs.blog/2018/02/unintended-consequences/](https://www.fs.blog/2018/02/unintended-consequences/)

**TEAM LEARNING LAUNCH DESIGN DUE—WEDNESDAY, MAY 2ND**

**FINAL PROJECT SUBMISSION DUE—BEFORE NOON ON WEDNESDAY, MAY 9TH**  
**TEAM PEER EVALUATION DUE—BEFORE NOON ON THURSDAY, MAY 10TH**