This course surveys over 100 design principles applicable to nearly every design profession. You will gain a foundational understanding of universal laws of design, human factors and design methodologies that you can use throughout your education and career pursuits.

Learning Objectives
Upon successful completion of this course, students will:

- Be able to identify principles of design in objects, digital and analog
- Articulate steps within the design process and prepare materials related to and around the process
- Critique and judge designs by principles, rather than notions or vaguely-formed opinions

Course Materials
In addition to an open mind, you will need:

- A sketchbook (without lines)
- A sharpie

All readings are available electronically, either through McDermott Library or as an excerpt. The following books are the basis for this course:

- Universal Principles of Design
  William Holden

- Managing the Design Process: Implementing Design
  Terry Lee Stone

Course Requirements and Grading
A list of assigned readings and materials is attached. Supplemental materials may be provided or posted electronically. Advance preparation and enthusiastic participation is an important part of the learning experience and critical to in-class discussions.

10% Attendance
20% Quizzes
20% Weekly Assignments
25% Semester Project Phases 1-2
25% Semester Project Phases 3-4

Semester Project
Select a website, app, online interaction, operating system, or other interactive visual media to redesign.

Your project will be in two parts: a cognitive teardown, disassembling the current design using the principles discussed in class, and a cognitive build-up, your reconstruction of the design. You may work in groups of two to three.

Part 1: Cognitive Teardown
The cognitive teardown allows students to demonstrate an understanding of design principles discussed in class by analyzing and critiquing the design of a product related to their area of interest.

Part 2: Cognitive Build-Up
The cognitive build-up allows students to demonstrate an understanding of the design principles discussed in class by creating a design (or a redesign) for a product related to their area of interest.
**Introduction: What is Design?**

We define what we mean by ‘design’. The following sentence by John Heskitt should seem less esoteric by the end of class: Design is to design a design to produce a design.

**Readings**

Garret: User Experience and Why It Matters

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**Week 1**

Jan.

12, 14, 16

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**Less is More**

The more stuff in it, the busier the work of art, the worse it is. More is less. Less is more.

**Principles**

- **Form Follows Function** – beauty is purity of function
- **Ockham’s Razor** – choose simplest of functionally equivalent designs
- **80/20 Rule** – 80% of products use involves 20% of its features
- **Flexibility-Usability Tradeoff** – as flexibility increases, usability decreases
- **Horror Vacui** – tendency to fill blank spaces
- **Propositional Density** – relationship between design elements and meaning they convey
- **Signal-to-Noise Ratio** – choose design that has high signal-to-noise ratio

**Assignment**

- **Quiz**: Less is More
- **Sketching Challenge**

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**Week 2**

Jan.

21, 23

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**Design Process**

We examine a design process that allows you to interpret and intentionally address a problem. A problem should be approachable, understandable and actionable, and it should be clearly scoped—not too big nor too small, not too vague nor too simple.

**Principles**

- **Accessibility** – objects should be usable by as many people as possible
- **Design by Committee** – design process based on group consensus
- **Development Cycle** – heuristic steps of discovery
- **Garbage-In-Garbage-Out** – quality output depends on quality info in
- **Iteration** – repeated operations to reach desired result
- **Life Cycle** – stages of product existence
- **Most Advanced Yet Acceptable** – finding most commercially viable design aesthetic
- **Personas** – use archetypes to guide decision making in design process
- **Prototyping** – simplified models to explore ideas
- **Satisficing** – settle for satisfactory rather than optimal solution
- **Scaling Fallacy** – tendency to assume system will also work at different scale
- **Storytelling** – create imagery, emotions and understanding

**Assignment**

- **Quiz**: Design Process
- **Project**: Pitch three (3) ideas for possible redesigns

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**Preparation**

- Buxton: Sketches Are Not Prototypes (PDF)
- Buxton: Why Should I Sketch (online)
- Buxton: The Sketchbook: Your Basic Resource for Recording, Developing, Showing and Archiving Ideas (online)

**In-Class Design Challenge**

- Be dense: Calculate the propositional density of a logo

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**In-Class Design Challenge**

- 10 Plus 10
Aesthetic Bias
We examine our natural bias toward beauty and order.

Principles
- Aesthetic-Usability Effect – aesthetic design perceived to be easy to use
- Attractiveness Bias – why beautiful people excel
- Baby-Face Bias – attraction to all things cute
- Closure – seeing groups of design elements as one large design element
- Constancy – perception of constancy in spite of actual expression
- Fibonacci Sequence – sequence of numbers that are sum of two preceding
- Golden Ratio – geometric theorem for balance in design
- Good Continuation – Gestalt of perceived connectivity of elements
- Law of Prägnanz – tendency to interpret ambiguous info
- Picture Superiority Effect – remember pictures better than words
- Prospect-Refuge – tendency to prefer unobstructed views and areas of concealment
- Savanna Preference – aboriginal preference for open spaces
- Wabi-Sabi – objects that embody nature and simplicity are more meaningful

Preparation
Anderson: In Defense of Eye Candy (online)
Gupta: Applying Mathematics to Web Design

In-Class Design Challenge
Infographic Sketching

Dimensional Perception Preferences
We examine how we perceive the three-dimensional world around us.

Principles
- Common Fate – objects in the same direction are related
- Defensible Space – space that indicate territory and ownership
- Figure-Ground Relationship – perceived objects in front of a field
- Orientation Sensitivity – discrimination of directional elements
- Three-Dimensional Projection – tendency to perceive world in 3-D
- Top-Down Lighting Bias – tendency to understand source of lighting
- Visibility – spatial cognitive understanding
- Wayfinding – special information to enhance navigation

Preparation
99% Invisible Podcast #126: Walk This Way

In-Class Design Challenge
You Are Here: Wayfinding Challenge
Aesthetic Toolbox

We examine principles that can be used in composing designs, displaying information and creating interfaces.

**Principles**

- **Alignment** – design elements align along hidden lines
- **Color** – symbolic meanings in color to manipulate and emphasize
- **Consistency** – usability improved when similar parts expressed in similar ways
- **Convergence** – synonym for stability in designed solutions
- **Highlighting** – bringing visual attention to design elements
- **Iconic Representation** – icons improve recognition and recall
- **Modularity** – complex system divided into smaller compatible parts
- **Normal Distribution** – symmetrical data, bell-curve
- **Proximity** – info close together perceived to be related
- **Rule of Thirds** – composition technique for balance
- **Similarity** – elements of similar nature seem related
- **Symmetry** – visual equivalence among elements

Preparation

- RadioLab Podcast: *Rippin’ the Rainbow a New One*
- Charchar: *The Secret Law of Page Harmony*
- White: *10 Rules of Color*
- White: *What is Color Theory?*

In-Class Design Challenge

- Four Icon Story: Tell a famous story using four icons

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Psychology and Aesthetics

We examine our psychology and the limits of our ability to perceive.

**Principles**

- **Biophilia Effect** – nature views enhance focus and concentration
- **Cathedral Effect** – high ceilings for creativity; low ceilings for detail-oriented thinking
- **Cognitive Dissonance** – tendency to seek consistency in thinking
- **Depth of Processing** – deeply analyzed information is quickly recalled
- **Framing** – manipulating how information is presented
- **Hierarchy of Needs** – stratification of aesthetic needs based on Maslow
- **Inattentional Blindness** – inability to process something in plain view
- **Mnemonic Device** – organize information to make it memorable
- **Nudge** – alter behavior with little changes
- **Operant Conditioning** – perceptional modification via range of stimuli
- **Priming** – activating concepts in memory to influence subsequent behaviors
- **Threat Detection** – natural abhorrence to negative imagery
- **von Restorff Effect** – well placed discontinuity to engage memory

Preparation

- 99% Invisible Podcast #76: *The Modern Moloch*

In-Class Design Challenge

- **Don’t Card Me Bro**: Design a national identification card

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Assignment

- **Quiz**: Aesthetic Toolbox
- **Project – Phase 1**: Research brief

Assignment

- **Quiz**: Psychology and Aesthetics
- **Project – Phase 2**: List of deliverables
Human Factors

Week 8
March
2, 4, 6

We examine how we as humans interact and perform within a system.

Principles

Affordance – physical design telegraphs use and function
Desire Line – traces of use that indicate preferred methods of interaction
Entry Point – obvious point of entry into a design i.e., front door
Expectation Effect – leading the audience to an expected result
Forgiveness – help users avoid and minimize of consequences of errors
Freeze-Flight-Fight-Forfeit – ordered sequence of responses to acute stress
Interference Effects – conflicting cognitive processes slow down thinking
Mapping – cognitive understanding to initiate actions
Mental Models – cognitive understanding based on experience
Mimicry – transferring understood properties to new things
Performance Load – greater the effort, greater chance of failure
Performance vs. Preference – optimum gives way to preference
Progressive Disclosure – sequentially disclosed information
Readability – quick understandability
Recognition Over Recall – memory for recognizing things better than for recalling
Serial Position Effects – info at ends more memorable than middle

Preparation

McRaney: Confirmation Bias

In-Class Design Challenge
Interface Reducation

Assignment
Quiz: Human Factors

Information Architecture

Week 9
March
9, 11, 13

We examine how to organize, label and otherwise architect information within complex information systems.

Principles

Chunking – clustering information & elements to make memorable
Comparison – represent two or more variables in a controlled way
Confirmation – designed barriers to take next steps
Constraint – designed limitations to guide user
Control – put user in the drivers seat according to expertise
Feedback Loop – information return to modify future behavior
Fitts’ Law – time to move target is size and distance
Five Hat Racks – ways to organize information
Gutenberg Diagram – general pattern of eyes reading information
Hick’s Law – time increases as alternatives increases
Hierarchy – complex information organized and structured visually
Layering – organize info into related groups
Legibility – visual clarity, contrast, spacing etc.

Preparation

Norman: User-Centered Design

In-Class Design Challenge
Dollar Redesign: Redesign the US Dollar to make it accessible to as wide an audience as possible

Assignment
Quiz: Info Architecture
Project – Phase 2:
Preliminary Plan
**Sex Appeal**
We examine factors that contribute to our innate animal magnetism -- physical traits and psychological conditions.

**Principles**
- **Classical Conditioning** – associate stimulus with physical or emotional response
- **Contour Bias** – preference for contours instead of sharp angles or points
- **Face-ism Ratio** – ratio of face to body influences perception
- **MAFA Effect** – tendency to prefer facial features close to average of population
- **Red Effect** – women wearing red more attractive; men more dominant
- **Uncanny Valley** – anthropomorphic forms unappealing when very similar to humans
- **Veblen Effect** – tendency to find product desirable because of high price
- **Waist-to-Hip Ratio** – preference for particular ratio of waist size to hip size

**Preparation**
TBA

**In-Class Design Challenge**
TBA

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<th>March 30, April 1, 3</th>
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<tr>
<td><strong>Presentation: Project Update</strong></td>
<td>Present your cognitive teardown of the object you are redesigning to your classmates and obtain feedback.</td>
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| **Preparation** | Biederbeck: *The Four Essentials of a Design Critique*
McDaniel: *Design Criticism and the Creative Process*

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<th>Week 12</th>
<th>April 6, 8, 10</th>
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<tr>
<td><strong>Prototype Explorations</strong></td>
<td>Explore various approaches to your redesign and obtain user feedback.</td>
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| **Preparation** | Warfel: *Eight Guiding Principles*
Warfel: *Testing Your Prototype*

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<td><strong>High-Fidelity Prototyping</strong></td>
<td>Explore simple methods to create high-fidelity prototypes.</td>
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<td>TBA</td>
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<th>April 20, 22, 24</th>
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<td><strong>Workshop</strong></td>
<td>Obtain feedback on your semester project before presenting.</td>
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<td><strong>Preparation</strong></td>
<td>Duarte: <em>Slide:ology</em>, 4-61</td>
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<th>Week 15</th>
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<td><strong>Final Presentations</strong></td>
<td>Present your semester redesign project</td>
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<td><strong>Assignment</strong></td>
<td>Project - Phase 4: Present work</td>
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UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.