Design Principles and Practices

ATEC 6332
Tuesdays, 7-9:45 pm
ATEC 3.209

Fall 2016

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Wed 2-4 pm in ATC 3.210,
by appointment

The School of Arts, Technology and Emerging Communication
The University of Texas at Dallas

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 may use throughout your education and career pursuits.

Learning Objectives

Upon successful completion of this course, you will:

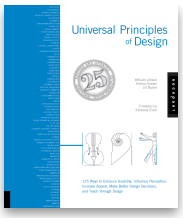
- **Identify principles of design** in man-made objects, digital and analog
- **Articulate steps within the design process** and prepare materials related to and around the process
- **Critique objects against principles** rather than notions or vaguely-formed opinions

Course Materials

In addition to an open mind, you will need:

- An unlined sketchbook
- A Sharpie
- An ultra fine point marker

You will need the following books for this course:

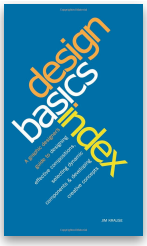


Universal Principles of Design, Second edition
William Holden

ISBN 1592535879

Managing the Design Process: Implementing Design
Terry Lee Stone

ISBN 1592536190



Design Basics Index
Jim Krause

ISBN 1581805012

Philosophy

Good design expresses insight into human behavior, psychology, perception and meaning making. This course balances a scholarly understanding of design with a practical execution of design.

Course Requirements and Grading

A list of assigned readings and materials is attached. Supplemental materials are posted electronically. Advance preparation and enthusiastic participation is an important part of the learning experience and critical to in-class discussions.

10%	**Class attendance**
15	**Card deck sketches**
20	**Quizzes**
20	**Weekly Assignments**
20	**Semester Project Phases 1-2**
15	**Semester Project Phases 3-4**

Semester Project: Design Process

Designers have a series of repeatable steps and procedures that make them true professionals. Our processes determine the quality of our products.

The semester project is your opportunity to follow a design process from start to finish and demonstrate your understanding of design principles by redesigning a website, app, or interface.

Design Principles

The principles we will study this semester are divided into nine major categories and colour coded.

Aesthetic Bias
Aesthetic Toolbox
Design Process
Dimensional Perception
Preferences
Human Factors
Information Architecture
Less is More
Psychology and Aesthetics
Sex Appeal

Semester Schedule

The following week-by-week breakdown explains the structure of the course. Complete explanations of what is due, additional reading materials, quizzes and assignment submissions are on eLearning, **elearning.utdallas.edu**.

Introduction: What is Design?

Week 1
Aug 23

We define what we mean by 'design' and explore the difference between art *and* 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.*

Read by Aug. 30

Garrett: *User Experience and Why It Matters*
Rutledge: *Creativity is Not Design*
Rolston: *The Politics of Moving Minds*
Brown: *Learning is Misunderstood*
The Less is More set of principles

Homework: Complete by Aug. 30

Complete the above readings and be prepared to discuss in class.
Review the Less is More principles.
Take the Less is More Quiz before class.

Less is More

Week 2
Aug 30

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

Principles We Will Review in Class (Aug. 30): Less is More

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*

In-Class Design Challenge (Aug. 30)

Be dense: Calculate the propositional density of a logo

Read by Sept. 6

Buxton: *Why Should I Sketch* (online)
Buxton: *The Sketchbook: Your Basic Resource for Recording, Developing, Showing and Archiving Ideas* (online)
Buxton: *10 Plus 10*
Rohde: What Are Sketchnotes
Rohde: Why Sketchnote
The Design Process set of principles

Homework: Complete by Sept. 6

Review the Design Process principles.
Take the Design Process Quiz before class.
Submit your **Design Challenge** assignment to eLearning (Propositional Density)

Design Process

Week 3
Sept 6

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

Principles We Will Review in Class (Sept. 6): Design Process

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*

In-Class Design Challenge (Sept. 6)

Save the Save Button: Use the 10 Plus 10 Method to redesign the Save button

Read by Sept. 13

Stone: *Project Management*
McDaniel: *Design Criticism and the Creative Process*
Greene: *Win Through Action, Never Through Argument*
The **Aesthetic Bias** set of principles

Homework: Complete by Sept. 13

Complete the above readings and be prepared to discuss in class.
Review the **Aesthetic Bias** principles.
Take the **Aesthetic Bias Quiz** before class.

Aesthetic Bias

Week 4
Sept 13

We examine our natural bias toward beauty and order.

Principles We Will Review in Class (Sept. 13): Aesthetic Bias

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*

Read by Sept. 20

Anderson: *In Defense of Eye Candy*
Gupta: *Applying Mathematics to Web Design*
The **Dimensional Perception Preferences** set of principles

Homework: Complete by Sept. 20

Complete the above readings and be prepared to discuss in class.
Review the **Dimensional Perception Preferences** principles.
Take the **Dimensional Perception Preferences Quiz** before class.

Week 5
Sept 20

Dimensional Perception Preferences

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

Principles We Will Review in Class (Sept. 20): Dimensional Perception Preferences

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*

In-Class Design Challenge (Sept. 20)

You Are Here: Wayfinding Challenge

Read by Sept. 27

99% Invisible Podcast #126: *Walk This Way*
The Aesthetic Toolbox set of principles

Homework: Complete by Sept. 27

Complete the above readings and be prepared to discuss in class.
Review the Aesthetic Toolbox principles.
Take the Aesthetic Toolbox Quiz before class.

Week 6
Sept 27

Aesthetic Toolbox

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

Principles We Will Review in Class (Sept. 27): Aesthetic Toolbox

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*

In-Class Design Challenge (Sept. 27)

Four Icon Story: Tell a famous story using four icons

Read by Oct. 4

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?*
The Psychology and Aesthetics set of principles

Homework: Complete by Oct. 4

Complete the above readings and be prepared to discuss in class.
Review the Psychology and Aesthetics principles.
Take the Psychology and Aesthetics Quiz before class.

Psychology and Aesthetics

Week 7
Oct 4

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

Principles We Will Review in Class (Oct. 4): Psychology and Aesthetics

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*

In-Class Design Challenge (Oct. 4)

TBA

Read by Oct. 11

99% Invisible Podcast #76: *The Modern Moloch*
The **Human Factors** set of principles.

Homework: Complete by Oct. 11

Complete the above readings and be prepared to discuss in class.
Review the **Human Factors** principles.
Take the **Human Factors Quiz** before class.

Human Factors

Week 8
Oct 11

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

Principles We Will Review in Class (Oct. 11): Human Factors

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*

Read by Oct. 18

McRaney: *Confirmation Bias*
The **Information Architecture** set of principles

Homework: Complete by Oct. 18

Complete the above readings and be prepared to discuss in class.
Review the **Information Architecture** principles.
Take the **Information Architecture Quiz** before class.

Information Architecture

Week 9
Oct. 18

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

Principles We Will Review in Class (Oct. 18): Information Architecture

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.*

In-Class Design Challenge (Oct. 18)

Dollar Redesign: Redesign the US Dollar to make it accessible to as wide an audience as possible

Read by Oct. 25

Norman: *User-Centered Design*
The **Sex Appeal** set of principles

Homework: Complete by Oct. 25

Complete the above readings and be prepared to discuss in class.
Review the **Sex Appeal** principles.
Take the **Sex Appeal Quiz** before class.

Sex Appeal

Week 10
Oct. 25

We examine factors that contribute to our innate animal magnetism -- physical traits and psychological conditions.

Principles We Will Review in Class (Oct. 25): Sex Appeal

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*

In-Class Design Challenge (Oct. 25)

TBA

Read by Nov. 1

TBA

Presentation: Project Update

Week 11
Nov. 1

Present your cognitive teardown of the object you are redesigning to your classmates and obtain feedback.

Preparation

Biederbeck: *The Four Essentials of a Design Critique*
McDaniel: *Design Criticism and the Creative Process*

Week 12
Nov 8

Prototype Explorations

Explore various approaches to your redesign and obtain user feedback.

Preparation

Warfel: *Eight Guiding Principles*
Warfel: *Testing Your Prototype*

Week 13
Nov 15

High-Fidelity Prototyping

Explore simple methods to create high-fidelity prototypes.

Preparation

TBA

Week 14
Nov 29

Workshop

Obtain feedback on your semester project before presenting.

Preparation

Duarte: Slide:ology, 4-61

Week 15
Dec 6

Final Presentations

Present your semester redesign project

Week 16
Dec 13

Final Presentations

Present your semester redesign project

Semester at a Glance

The first 10 weeks of the semester are devoted to learning, understanding and apply principles of design through readings, slides and challenges. In the remaining weeks, you apply the design process to your semester project.

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Principles	●	●	●	●	●	●	●	●	●						
Quiz		●	●	●	●	●	●	●	●						
Cards		●	●	●	●	●	●	●	●	●					
Design Challenge		●		●		●	●		●	●					
Community activity							●								●
Semester Project				●		●		●		●	●	●	●	●	●

Syllabus Policies

Review **go.utdallas.edu/syllabus-policies** for additional policies and procedures.