CS-639 Interaction Design Studio — Syllabus

Course Information

Course Subject, Number and Title: COMPSCI 639 Interaction Design Studio

Credits: 3

Credit Hour Explanation: This class meets for three, 50-minute class periods each week over the fall/spring semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of the classroom for every class period. The syllabus includes additional information about meeting times and expectations for student work.

Course Description: Interaction Design Studio is a hands-on, studio-format course focused on developing creative fluency in designing interactive systems. Students learn core skills in visual design, interaction design, and user experience through iterative, low- to mid-fidelity design exercises. Emphasizing doing over lecturing, the course cultivates a practice of sketching, critique, and reflection as students explore how to give form to interfaces and behaviors. Projects evolve from paper-based designs to digital mockups, with special attention to composition, flow, and transitions. The course also examines the role of artificial intelligence in contemporary design practice—both as a tool for generating and refining ideas and as a material that shapes new modes of interaction. Students leave with a portfolio-ready project and the foundational skills needed to design compelling digital experiences.

Requisites: None

Course Designations/Attributes: Undergraduate course in computer science

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Learning Outcomes

By the end of this course, students will be able to:

- Generate, develop, and communicate design concepts for interactive systems through sketching, flow-based thinking, and visual storytelling
- Apply principles of visual and interaction design, including hierarchy, composition, typography, and color, to create clear and compelling user interfaces
- Frame design problems using design thinking and user-centered methods, such as personas, scenarios, and user journeys
- Understand intelligence as a design material that enables new interaction paradigms across a spectrum from passive tools to autonomous agents
- Design interactions across varying levels of agency, from direct manipulation to mixed-initiative collaboration to autonomous adaptation
- Create context-aware and adaptive interfaces that respond appropriately to user needs, situation, and temporal evolution
- Model interactive behaviors and feedback flows, including transitions, microinteractions, and adaptive responses from AI-driven systems
- Create low- and medium-fidelity prototypes using both analog (paper) and digital (Figma) tools, progressing from individual screens to system-level design
- Develop and document a design system, including consistent UI components and interaction patterns
- Engage constructively in critique, iterating on design work in response to peer and instructor feedback
- Use AI as both a design tool (for ideation and acceleration) and design material (as a property that shapes interaction possibilities), while critically evaluating its role in user interaction
- Reflect on accessibility, universality, and long-term implications of design decisions in shaping responsible and inclusive interfaces
- Deliver a portfolio-ready design project, demonstrating fluency across ideation, design development, and systems thinking

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Meeting and Instructor Information

Meeting Time and Location: MWF 9:55–10:45 am, Morgridge Hall B2590

Discussion and/or Lab Section Information: None

Instructional Modality: In-person

Instructor Title and Name: Professor Bilge Mutlu

Instructor Contact Information: bilge@cs.wisc.edu

Day/Time/Location of Office Hours: Wednesdays 11 am - 12 pm, MHB 2544

Teaching Assistant Name(s): Xinning He

Teaching Assistant Contact Information: xhe368@wisc.edu

Day/Time/Location of TA Office Hours: Mondays 11 am - 12 pm, MHB 2544

Preferred Method of Contact: Email hci-class@cs.wisc.edu (received by instructor + TA)

Overview

Studio Philosophy & Pedagogical Approach

This course is structured as a design studio, a pedagogical format widely used in architecture, industrial design, and visual communication, and increasingly adopted in HCI and interaction design education. Studio-based learning emphasizes learning-by-doing, reflection-in-action, and iterative critique. Unlike traditional lecture-based courses, where knowledge is presented for passive absorption, studio courses are immersive environments where students develop fluency through creative practice.

In a studio, learning happens through making. Students generate design ideas, visualize alternatives, and refine their work through feedback. Equally important is the culture of critique, where students present work-in-progress and learn from each other's thinking and perspectives.

This course adopts the studio model because design is not just something we learn about; it's something we learn through doing. By practicing interaction design in a studio context, students build confidence, critical thinking, and visual literacy that cannot be gained through readings or exams alone.

Operationalizing Studio in This Class

- **Three-day rhythm**: Mondays involve lecture/discussion to introduce theory and concepts; Wednesdays are hands-on studios to apply those concepts; Fridays alternate between critique and assignment workshops
- **Analog-to-digital progression**: Students begin with paper sketching and analog tools (Weeks 1-5), transition to digital tools like Figma (Week 6+), then integrate AI tools for ideation and acceleration (Weeks 9+)
- **Low-to high-fidelity progression**: Students begin with sketching and visual thinking on paper and gradually move into digital tools like Figma
- **Critique as learning**: Students receive regular feedback from peers and the instructor.

Critiques are structured, constructive, and focused on design intent and execution

- **Integrated assignments**: Each instructional block concludes with an assignment that synthesizes the week's studio work into a coherent design submission

Studio is where the muscle of design gets built. It is a space for experimentation, failure, iteration, and growth, all essential aspects of becoming a confident, capable interaction designer.

Tools & Materials

This course emphasizes learning by doing, through sketching, making, critiquing, and refining design ideas. Students will engage with a range of tools and materials across the semester in a carefully staged progression: **analog first → digital refinement → AI augmentation**. This approach encourages creative exploration early on and prevents tools from dictating design thinking.

Phase 1: Analog Foundation (Weeks 1–5)

Students will primarily use paper-based tools to sketch interfaces, flows, and states. Working with analog materials encourages speed, iteration, and breadth of ideas without premature polish. Required materials include:

- Sketchbook or loose paper (8.5x11 or larger)
- Pencils, pens, fine-tip markers (Sharpie fine point)
- Colored markers or highlighters (3-5 colors recommended)
- Sticky notes
- Scissors and tape/glue for assembling paper flows (optional)
- Printable device templates (provided by instructor)

Note: Many of these materials will be provided by the instructor either individually or to design pods (groups of students who are seated at the same classroom "pod").

Phase 2: Digital Transition (Weeks 6–14)

As students focus their design direction and interaction details, they will transition to digital wireframing and prototyping tools. The analog practice continues in parallel for ideation. Tools include:

- **Figma** (free educational account required) - introduced Week 6 with dedicated workshop
- Phone or tablet camera for photographing and uploading sketches
- Google Slides, Miro, or other layout/mapping tools (optional)

Workflow: Students sketch first on paper, then refine in Figma. Every digital assignment requires documentation of analog ideation process.

Phase 3: AI Augmentation (Weeks 9–14)

Students will use AI tools to accelerate ideation, generate variations, and explore possibilities—but only after developing strong design judgment. AI serves as an accelerator and collaborator, not a replacement for design thinking.

- **ChatGPT/Claude** (Week 9): Ideation partner, persona generation, content creation
- **Midjourney/DALL-E** (Week 10): Visual exploration, mood boards, placeholder imagery
- **Figma AI plugins** (Week 11): Layout generation, accessibility checking, design tokens
- All existing analog and digital tools continue as needed

Whether analog or digital, students are expected to bring in-process work to each Friday studio for structured critique. Final deliverables may include a combination of paper and digital artifacts, along with brief process documentation.

Digital Tools: Figma

All students will use Figma as the primary digital tool for interface and interaction design in this course. Figma is a cloud-based, collaborative design tool widely used in professional practice. It supports rapid iteration, feedback, and integrates with a growing ecosystem of design and AI tools.

Why Figma?

- Cloud-based: work from anywhere
- Real-time collaboration: ideal for studio critique
- Free educational access provided
- Supports screen design, interaction flows, visual systems, and more
- Strong alignment with industry standards

Access: You will receive instructions during Week 5 for setting up your Figma account using the educational license provided by the course. No prior experience is required—a dedicated Figma workshop will be provided in Week 6.

Grading

Final grades in this course are based on a combination of participation in weekly studio work, completion of integrative assignments, and attendance. The grading structure is designed to reward consistent engagement, reflective growth, and design craftsmanship over time.

Canvas Group	Weight	Description
Reading & Reflection	10%	Weekly reflections assessed using a check system (see below).
Studio Work	25%	Weekly hands-on studio activities assessed using the same check system.
Assignments	60%	Assignment 1: Foundations Portfolio (15 pts), Assignment 2: Intelligent System Design (15 pts), Final Project (30 pts). Point values within this group determine each assignment's share of the 60%.
Attendance & Professional Conduct	5%	Includes regular presence, punctuality, contribution to critique, and collaborative behavior.

How Canvas Calculates Your Grade

Your grade uses **weighted assignment groups**, not raw point totals. Here's how it works:

- **Reading & Reflection (10%):** Each reflection is worth 1 pt. Canvas averages your reflection scores as a percentage, then applies the 10% group weight. Example: if you earn 9.5 out of 10 possible points across all reflections, that's 95% × 10% = 9.5% of your final grade.
- **Studio Work (25%):** Same system — each activity is 1 pt, averaged within the group, then weighted at 25%.
- **Assignments (60%):** Contains A1 (15 pts), A2 (15 pts), and the Final Project (30 pts) — totaling 60 pts. Canvas averages by points, so each assignment's contribution to the 60% is proportional to its point value: A1 = 15%, A2 = 15%, Final = 30% of your overall grade.
- **Attendance (5%):** Single entry, graded manually.

Check System (Reflections & Studio Work)

Weekly reflections and studio activities are graded using a simple check system:

Mark	Meaning	Points
√	Satisfactory — completed with engagement	1
√−	Incomplete or minimal effort	0.5
√+	Exceeds expectations (rare — treated as extra credit)	1.5
Missing	Not submitted	0

Full credit is awarded for consistent engagement and improvement over the semester.

Attendance & Late Work

Studio-based learning depends on consistent presence and engagement. Critique sessions require your participation—both to receive feedback on your own work and to contribute to your peers' growth. The following policies balance flexibility with the collaborative nature of this course.

Attendance Policy

Attendance matters. Critique depends on your presence, and studio work cannot be replicated outside of class.

- **3-day absence bank:** You have three (3) class sessions you may miss without penalty during the semester. These absences can be used for any reason—illness, travel, personal matters—and do not require documentation or advance notice.
- **Beyond the bank:** Additional absences beyond the 3-day bank will result in deductions from your Attendance & Professional Conduct grade. Excessive absences (more than 6 total) may result in a failing grade.
- **Excused absences:** University-recognized absences (religious observances, athletic events, documented emergencies) do not count against your absence bank when properly documented.
- **Arriving late or leaving early:** Chronic lateness or early departures will be counted as partial absences at the instructor's discretion.

Late Submission Policy

Design is iterative, and sometimes you need more time to get things right. However, timely submission ensures fair critique and feedback cycles.

- **3-day late bank:** You have three (3) late days to use across Assignment 1 and Assignment 2 during the semester. A late day is defined as any portion of a 24-hour period after the deadline.
- **Using late days:** Late days are applied automatically—no need to notify the instructor. You may use multiple late days on a single assignment (e.g., all 3 days on Assignment 2) or spread them across assignments.
- **Beyond the bank:** Assignments submitted late after your late bank is exhausted will receive a 10% penalty per day, up to 3 days. Assignments more than 3 days late (beyond your bank) will not be accepted.
- **Final project:** Late days cannot be applied to the final project, which must be submitted by the finals week deadline.

Grade Expectations

As a rule of thumb: you will receive an A or AB if you complete all work and attend consistently. The distinction between A and AB depends on the quality and craftsmanship of your design work. Regular engagement, iteration based on feedback, and demonstrated growth are the keys to success in this studio.

Workload Expectations

Expect to spend approximately 6–8 hours per week outside of class on sketching, critique preparation, assignments, and reflection. This time includes:

- Mini-exercises following Monday lectures
- Developing and refining studio work
- Preparing for Friday critiques
- Completing block-based assignments

Schedule

Weekly Class Flow

Based on the pedagogical principles of studio-based instruction, the course follows a consistent weekly rhythm that supports creative thinking, hands-on design work, and critique.

- **Mondays** are lecture-based and introduce new design concepts, tools, or frameworks. Students are expected to take notes, ask questions, and absorb foundational ideas.
- **Tuesdays (homework)** provide time for students to complete a mini-design or sketch exercise that puts Monday's concepts into practice.
- **Wednesdays** are hands-on studio days: students bring their sketches and ideas to class and continue developing them using the week's design prompt.
- **Thursdays (homework)** offer additional time to revise and refine the design work based on what they explored on Wednesday.
- **Fridays** are dedicated to studio critiques: students present their work, receive feedback from peers and the instructor, and reflect on how their designs could improve.
- **Weekends (optional)** are encouraged for reflective practice: students may choose to maintain a design log or journal to track their evolving process, successes, and struggles.

This structured weekly flow reinforces an iterative design process and supports the development of fluency, creativity, and critical feedback skills.

Phase 1: Design Foundations (Weeks 1–6)

This six-week phase establishes the visual, structural, and interaction design foundations for designing interactive systems. Students master design elements, principles, typography, color, grids, spacing, composition, flow design, navigation, and information architecture. Intelligence concepts are previewed lightly in Weeks 3-6, with students observing how systems signal and use intelligent behavior.

Primary tools: Paper, markers, sketching (Weeks 1-5); Figma introduced Week 6

Week	Theme	Monday (Lecture)	Wednesday (Studio)	Friday (Critique/Activity)
W01	What is Interaction Design?	— (MLK Day, no class)	What is interaction design? Design vs. implementation. Studio format & critique etiquette.	Warm-up challenge: 6-up sketch (e.g., alarm clock, calendar)
W02	Design Elements & Principles	Elements (line, shape, space, color, texture, pattern, value), Principles (balance, contrast, rhythm, unity, hierarchy, Gestalt)	Community event screen design challenge	Peer critique of compositional clarity and formal balance
W03	Typography, Icons & Intelligent Affordances	Typography systems, visual hierarchy, iconography, affordances, signifiers. **Intelligence preview:** How do we visually signal "smart" features?	Redesign existing interface emphasizing type & icon treatment. Add visual signals for 1-2 intelligent features.	Critique on affordances and clarity of visual communication. How does intelligence enhance vs. complicate?
W04	Color, Grids, Spacing & Alignment	Color theory & accessibility (WCAG contrast ratios, color vision). Grid systems (columns, gutters, margins). 8-point spacing systems. Alignment types. **Intelligence preview:** Predictable adaptation — surface vs. structure (dark mode, compact mode).	Design 3 related screens + 1 adapted variant with accessible color system, consistent grid, 8pt spacing, and clear alignment. Annotate surface (what changed) vs. structure (what stayed).	Critique on visual system consistency, accessibility, spacing rhythm, alignment discipline, and adaptation quality.
W05	Composition & Flow Design	Composition principles (focal point, visual weight, negative space). Visual scan patterns (F-pattern, Z-pattern). Flow design and notation (screens, decisions, transitions). **Intelligence principles:** P6 Contextual Awareness, P7 Explain When Needed, P8 Timely Intervention. **Assignment 1 posted.**	Studio: Design task flow for Assignment 1 app — task flow → wireflow → intelligence layer. Work feeds into A1.	Critique on composition clarity, visual hierarchy, and flow logic.
W06	Navigation, IA & Intelligent Collaboration	Information architecture (4 structural categories, combining structures). Navigation principles (wayfinding, cost, aids). Navigation models (hub-and-spoke, flat, multi-level, stepwise + patterns for intelligent systems). **Intelligence principles:** P9 User Correctability, P10 Smooth Initiative Transitions.	**Figma Workshop (TA-led):** Frames, layout grid, auto-layout, color styles. Students translate Assignment 1 screens to Figma.	Design challenge (navigation + adaptive layer) worked independently — feeds into A1.

Assignment 1 due Monday, March 9 (Week 8 morning): Foundations Portfolio — 4-6 screen designs synthesizing all design fundamentals (visual design, color, grid/spacing, composition, flow, navigation) + intelligence annotations (P1-P10) + Figma translation (2-3 screens) + process documentation + 500-word reflection. Studio work from Weeks 5-6 feeds directly into this assignment.

Phase 2: Bridge to Intelligence (Week 7)

This pivotal week synthesizes the design foundations from Weeks 1-6 and introduces "intelligence as design material" — a framework showing how intelligence transforms every design concept learned so far. Students apply intelligence properties to their existing designs.

Primary tools: Figma, paper for ideation

Week	Theme	Monday (Lecture)	Wednesday (Studio)	Friday (Critique/Activity)
W07	Intelligence as Design Material	Foundation synthesis: What you've built in Weeks 1-6. Intelligence as material property (adaptivity, initiative, inference, delegation, collaboration, contextuality). How intelligence transforms each foundation area. Design dimensions: initiative spectrum, control distribution, interaction abstraction.	**Redesign with Intelligence:** Choose a Week 1-6 design, add ONE intelligence property. Show original vs. intelligent version. Document what changes and what stays.	Before/after critique. What did intelligence enable? Is it signaled clearly? Does user maintain control? Preview Week 8: Agency Spectrum.

Phase 3: Intelligence Properties (Weeks 8–11)

This four-week phase explores core intelligence material properties in depth. Students develop fluency in designing with agency, proactivity, collaboration, and context-awareness. AI tools are introduced for ideation and prototyping. Week 10 adds two generative AI principles (P11–P12) grounded in students' Week 9 tool experience.

Primary tools: Figma primary, AI tools introduced (ChatGPT/Claude Week 9, image generation Week 10, Figma plugins Week 11)

Week	Theme	Monday (Lecture)	Wednesday (Studio)	Friday (Critique/Activity)
W08	Agency Spectrum	From tools to agents. Parasuraman's levels of automation. Passive vs. proactive vs. autonomous systems. Case studies across agency spectrum. When to give system more/less control.	Map familiar domain across agency levels. Design interfaces at different automation levels. Create visual spectrum diagram.	Agency appropriateness critique. Where should control reside and why?
W09	Proactivity & Timing	Anticipatory systems. When to interrupt vs. wait. Modeling user attention. Proactive suggestions. **AI introduction:** ChatGPT/Claude for persona generation. Students experience genAI variability and imperfection firsthand.	Design proactive interface. Use AI for persona development and scenario generation. Focus on timing and presentation.	Proactivity critique. Is timing appropriate? Does anticipation help or annoy?
W10	Collaboration & GenAI	Human-AI collaboration patterns. Turn-taking, negotiation, handoff points. **P11 (Generative Variability) and P12 (Productive Imperfection) introduced** — grounded in Week 9 tool experience. Co-creation workflows.	Generative AI Audit — evaluate a tool using P1–P12. Design collaborative flow showing user-leads, AI-leads, and negotiation moments.	Role-playing critique. Pairs enact user/AI scenarios. Document what works/breaks.
W11	Context-Awareness & Adaptation	Context dimensions: physical, social, task, cognitive. Adaptive systems. Spotify, Apple Watch, iOS Focus Modes examples. **Figma AI plugins introduced.**	Create persona with context scenarios. Design interface adapting across 3+ contexts using Figma variants and AI plugins.	Transparency & control critique. Can users understand why system adapted?

Assignment 2 due Monday, April 13 (Week 12 morning): Intelligent System Design (3+ intelligence properties + complete interaction flows + before/after comparison + persona/context + reflection). Studio work from Weeks 10-11 feeds into this assignment.

Phase 4: Integration & Responsibility (Weeks 12–14)

This culminating phase focuses on systematic design for intelligence, ethical considerations, and final project integration. Students synthesize everything learned while critically reflecting on the responsible design of intelligent systems.

Primary tools: Full toolkit — students choose appropriate tools for the task

Week	Theme	Monday (Lecture)	Wednesday (Studio)	Friday (Critique/Activity)
W12	Design Systems for Intelligent Products	Component-based design for AI. Intelligence-specific components: confidence indicators, loading states, explainers, controls. Microinteractions and intelligent feedback.	Build intelligent design system in Figma. Standard + intelligence components. Add microinteraction specs.	Peer review: system consistency, documentation, and craftsmanship.
W13	Ethics, Accessibility & Responsible AI Design	Ethical dimensions: transparency, fairness, privacy, autonomy, manipulation. Accessibility for intelligent systems. Universal design. Shneiderman's Human-Centered AI.	Ethical audit of final project. Who is excluded? How transparent is AI? What could go wrong? Redesign problematic elements.	Final project midpoint critique. Focus: accessibility, transparency, user control, long-term implications.
W14	Final Project Development & Futures	Speculative design and future interactions. Multimodal AI, embodied agents, collective intelligence. Designing responsibly for uncertain futures.	Final project polish and documentation. Practice presentations.	Final presentations: 10 min presentation + 10 min critique. Focus: How did intelligence shape your design?

Finals Week: Submit final documentation + reflective essay (1000-1500 words). Weekly studio work from Weeks 12-13 (design systems, ethics) feeds naturally into the Final Project.

Assignment Structure

This course is organized around two major assignments and a final project. Each assignment serves as a culminating opportunity for students to synthesize what they have learned through weekly studio activities and critiques.

Assignment	Timing	Goal	Key Deliverables
A1: Foundations Portfolio	Due Mon Mar 9 (Week 8 morning). Weeks 5-7 studio work feeds in.	Demonstrate fluency in visual design, color systems, grid/spacing, composition, flow design, and navigation. Integrate intelligence principles (P1-P10).	Flow diagram + IA/navigation diagram + 4-6 screen designs + intelligence annotations (P1-P10) + Figma translation (2-3 screens) + process documentation + 500-word reflection
A2: Intelligent System Design	Due Mon Apr 13 (Week 12 morning). Weeks 10-11 studio work feeds in.	Design an intelligent system using 3+ intelligence properties with complete interaction flows and before/after comparison.	Persona + context scenarios + intelligent system using agency, proactivity, collaboration, and/or context-awareness + before/after comparison (traditional vs. intelligent) + reflection on design decisions
Final Project	Finals Week. W12-W13 weekly topics feed in.	Synthesize course learning in a polished intelligent system design, evaluated through universal design and ethical considerations.	Full design rationale + interaction flows + design system + microinteractions + prototype (Figma/Wizard-of-Oz/video) + critical reflection (1000-1500 words) on intelligence as design material

Grading model: During assignment periods (A1: Weeks 5-7, A2: Weeks 10-11), weekly studio work feeds directly into the assignment rather than being separately graded. In all other weeks, studio work and reflections are check-graded. Students are never working on two major assignments simultaneously.

Process documentation required: All assignments must include evidence of analog sketching → digital refinement → (when applicable) AI augmentation. The process matters as much as the output.

Final Project Requirements

Goal: Design a complete intelligent system that demonstrates understanding of intelligence as design material

Required Components:

1. **Problem Framing**
    - Persona and context
    - User needs and goals
    - Rationale for why intelligence is appropriate

2. **Interaction Design**
    - Complete flow showing human-AI collaboration
    - Appropriate agency level with rationale
    - Context-aware adaptations
    - Error handling and edge cases
3. **Visual Design System**
    - Standard UI components
    - Intelligence-specific components
    - Consistent visual language
4. **Microinteractions**
    - Detailed specs for key intelligent behaviors
    - Timing and animation notes
    - Emotional tone considerations
5. **Prototype**
    - Figma interactive prototype OR
    - Wizard-of-Oz demonstration OR
    - Video walkthrough
6. **Critical Reflection** (1000-1500 words)
    - How did intelligence shape your design decisions?
    - What level of agency did you choose and why?
    - What tensions did you navigate (adaptation vs. control, proactivity vs. interruption)?
    - What ethical considerations did you address?
    - How did analog→digital→AI tool progression shape your thinking?
    - What would you do differently?
7. **Process Documentation**
    - Photos of analog sketches (showing 10+ variations)
    - Digital refinement progression
    - Documentation of AI tool use (what was generated vs. what was kept/changed)

Evaluation Criteria:

- Appropriateness of intelligence level for task
- Clarity of human-AI collaboration patterns
- Quality of visual and interaction design
- Thoughtfulness about transparency and control

- Coherence and polish of overall system
- Depth of critical reflection
- Evidence of iteration and tool mastery

Academic Policies and Statements

Academic Calendar & Religious Observances | Academic Integrity | Accommodations for Students with Disabilities | Course Evaluations | Mental Health & Well-Being | Privacy of Student Records & Use of Audio Recorded Lectures | Students' Rules, Rights & Responsibilities | Teaching & Learning Data Transparency