Generative Design Workshop

Spring 2021

Zach Pino · Tuesdays 2pm to 5pm @ Zoom / Kaplan 211

Description

This course acts as a broad introduction to issues in contemporary product and service design related to data-driven visualization and form, algorithmic design, and digital fabrication. Loosely structured around the design opportunities found in ‘hyper-customized’ product design, students experiment with how cutting-edge design tools allow designers to craft an algorithm that in turn creates unique products, services, and experiences matched to each potential user and context. Students explore how the collection of data on individual scenarios can be integrated into every aspect of the design process — not only in insight discovery and process streamlining, but also in the direct shaping of final products and experiences.

Digital fabrication tools, long heralded by designers and engineers as a more sustainable, efficient, and capable replacement to traditional manufacturing techniques, are becoming widespread and accessible enough to support businesses based on these new sorts of customized products and experiences. Throughout this course, students will be exposed to a variety of digital fabrication tools – including 3d printing, laser cutting, and CNC machining — alongside the language, limitations, and capabilities of contemporary and near-future digital manufacture. The choice of fabrication technologies and strategies will vary based on student interest and resource availability.

Discussions about emerging resources in digital fabrication, issues in design inclusivity and accessibility, the overlap between contemporary form design and data visualization, remote data collection techniques, and applications for machine learning and artificial intelligence in design will be included alongside case-studies from the disciplines of design, architecture, and urban-planning. Students will leave the course having designed a thing that in turn designs an infinite variety of other things, enabling every potential user to have an experience that is fundamentally designed for them.

Format

This course will be structured as an experimental laboratory, with many opportunities for students to pursue their own independent areas of interest after a phase of technical skill-building, demonstrations, and exercises.

A singular final project will task students with framing and executing a project of their own choice featuring the techniques and approaches covered in class.

A diverse set of resources and technical skills will be presented and reinforced throughout the semester.

Office Hours

Tentatively, Fridays 12pm-2pm on Zoom

Students are encouraged to request socially-distanced in-person or remote meetings at any point by email

Generative Design Workshop

Spring 2021

Learning Objectives

- Acquire a basic understanding of programmatic form and visualization expression in code, instruction, data structures, and algorithmic pipelines
- Attain a high-level understanding of digital fabrication technologies and their appropriate uses and limitations
- Confront challenges in design inclusivity and product accessibility
- Gain comfortability in emergent design tools, and persevere through diverse technical challenges
- Develop a basic understanding of design intent expression in data structures, algorithmic definitions, and programmatic control structures
- Engage the 'designer-agency' issues inherent to contemporary design practices that implement programmatic design tools
- Use mathematical, computational, data-oriented, artistic, speculative, and poetic/expressive principles to achieve design objectives

Potential GenDes Tools

- Rhinoceros 3D
- Grasshopper
- SVG and GCode
- Python
- Laser Cutting
- 3D Printing
- CNC Machining
- Moldmaking and Casting
- Knitting and Weaving

Learning Support Covenants

Illinois Tech’s Accessibility Commitment

IIT is committed to fostering a campus that is increasingly accessible to people with disabilities. Each year IIT strives to remove obstacle that might impede learning and makes significant accessibility improvements to the campus.

Illinois Tech’s Statement on Community, Inclusion, and Diversity

Illinois Institute of Technology is a community that values and respects its members. We appreciate that our faculty, staff, students, alumni/ae, and trustees come from many backgrounds and many parts of the world. We embrace the contributions that differences offer. We are committed to providing a working and learning environment in which all students and all members of the faculty and staff are able to realize their full potential.

Pre-requirements

- Command of Adobe Illustrator, InDesign, and Photoshop or equivalents
- Willingness to prototype many ideas quickly
- Comfortability with working both individually and in teams, and providing honest critique
- Experience in sourcing, manipulating, and transforming data preferred, but not required

Generative Design Workshop

Spring 2021

Expectations

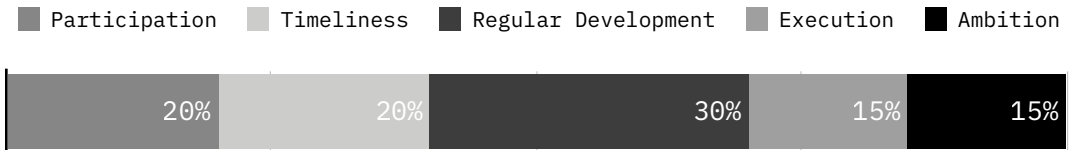
Students are expected to spend an average of 10 hours of outside-of-class time on…

- Idea development
- Primary, secondary, and prototyping research
- Technical exercises and tutorials
- Weekly "Dear Data" visualization experiments
- Readings

Onerous, and often unpredictable, financial expenditures on software and materials are an unavoidable part of the product design process. All efforts will be made to limit out-of-pocket costs, though students may consider spending $195 on Rhinoceros 3D, and up to $100 on digital fabrication services. **ID can help**, but formal requests for assistance must be made to faculty and school administration.

Grading

Students will be evaluated on the scope and ambition of their iteration and exploration, aesthetic quality of their work, participation and collaborative enthusiasm, and the clarity and legibility of their generative forms.



General Reference

Information is Beautiful
New York Times Data Journalism Lab
Flowing Data
Five Thirty Eight
Creative Applications Network
Data is Beautiful Subreddit
Data Physicalizations
Lynda Rhinoceros 3D Courses
Lynda Grasshopper Courses
Formularch Grasshopper Examples
Shapeways Printable Materials