ENGINEERING DESIGN INNOVATION

Degree Types: MS

The Master of Science in Engineering Design Innovation (https://design.northwestern.edu/engineering-design-innovation/) (EDI) at the Segal Design Institute is an 18-month, full-time design innovation graduate program that teaches students from a variety of backgrounds how to address complex design problems using an stakeholder-centered approach to human-centered design.

EDI students practice user observation, ideation, rapid prototyping, and iteration in a project-based studio environment. They work with multiple stakeholders, students, faculty, industry partners, and practicing professionals to tackle real problems in context.

Students graduate from EDI and take on roles such as product managers, design researchers, product designer engineers, digital experience and service designers ready to design new products and services that responsibly consider the needs of multiple stakeholders in complex ecosystems.

Typically those applying for the EDI program are recent graduates or have one to three years industry experience. We admit applicants with a variety of academic degrees across disciplines in STEM, humanities, and the arts. One of the strengths of our cohort model is the diversity of expertise our students have across various fields.

Contact the EDI program at edi@northwestern.edu.

Additional resources:

- Department website (https://design.northwestern.edu/engineering-design-innovation/)
- Program handbook(s)

Degrees Offered

- Engineering Design Innovation BS/MS (https://catalogs.northwestern.edu/tgs/engineering-design-innovation/engineering-design-innovation-bach-mast/)
- Engineering Design Innovation MS (https://catalogs.northwestern.edu/tgs/engineering-design-innovation/engineering-design-innovation-ms/)

Learning objective(s)/Students should be able to…

- Demonstrate expertise in design research methods
- Identify and frame unique opportunities from qualitative data
- Synthesize opportunities to viable solutions
- Demonstrate mastery in visual communication, complex storytelling, and presentation skills
- Demonstrate prototyping expertise in UI, Service, and Product Design
- Demonstrate high degree of professionalism, collaborative capabilities, and team leadership
- Demonstrate mastery of design thinking and methods

Engineering Design Innovation (EDI) Courses

DSGN 315-0 Design, Technology, and Research (1 Unit)
A jointly offered CS and Segal learning initiative that empowers students to drive cutting-edge research that shapes new experiences with people and technology. Students work with a mentor to identify a direction of research, explore and iterate over designs, prototype at varying fidelities, build working systems, conduct evaluative studies, and report findings through conference publications. DTR adapts agile development and design-based research practices with scrums, sprints, studio critique, design logs, and pair research. This class may be repeated for credit.

DSGN 350-0 Intellectual Property and Innovation (1 Unit)
Explores the critical role of designers, business strategists and engineers in the invention/creative process. All issues relating to patents and patentability of inventions, copyrights and the protection of the expressions of ideas, trademarks and source identifiers are reviewed and analyzed in the context of multiple engineering domains.

DSGN 376-0 Leonardo, Geometry, and the Art of Manufacturing (1 Unit)
In Walter Isaacson's 2017 biography of Leonardo da Vinci, the topic of geometry is referenced over 80 times. The only drawings by Leonardo that were published during his lifetime were illustrations for a textbook on geometry. The artist's final journal entry, written only days before his death, included attempts at a geometric proof. A friend of the artist once lamented in a letter, "He devotes much of his time to geometry, and has no fondness at all for the paintbrush." What compelled Leonardo's fascination with this subject? In this interdisciplinary class, we will explore Leonardo's geometric studies, using them as a vehicle for our own studies of artistic and industrial processes. Students will collaborate with artists, manufacturers, and technologists to produce sculptural objects in a range of materials. The course will culminate in a public iron pour in which we will attempt to translate several of Leonardo's sketches into cast-iron 3D pieces using a historical furnace in honor of the artist's work.

DSGN 395-0 Special Topics (1 Unit)
Topics relevant to design and approved by the institute.
Prerequisite: consent of instructor.

DSGN 401-1 Human-Centered Design Studio 1 (1 Unit)
This course is part one of the year-long studio sequence required in the EDI program, and provides a project-based introduction to human-centered product design. The entire class typically works with a single corporate client, who defines a problem area for the class to explore in teams. Teaching methods include lectures, labs, reading, homework assignments, and project deliverables. Reserved for students in the EDI program.

DSGN 401-2 Human-Centered Design Studio 2 (1 Unit)
This course builds upon DSGN 401-1, continuing to explore design of human-centered interactions. Students are challenged to design an experience which grows out of the interactions between a person and a product or service. Personas, use cases and scenarios will be introduced for modeling experiences. In this studio-based course, teaching methods include lectures, labs, reading, homework assignments and project deliverables. Reserved for students in the EDI program.

DSGN 401-3 Human-Centered Design Studio 3 (1 Unit)
This course builds upon DSGN 401-1, continuing the theme of designing interactions. Students are challenged to design a service experience in a specific opportunity area working with an external project partner. In this studio-based course, teaching methods include lectures, labs, reading,

homework assignments and project deliverables. Reserved for students in the EDI program.

DSGN 410-0 Design Research (1 Unit)
In this course, students learn the value of field research in the human-centered design process. In addition to homework assignments and labs, students work on a cumulative team-based research and design project that includes generative research, analysis and synthesis, brainstorming, concept generation, and concept evaluation. Open to EDI students only.

DSGN 420-2 Design Communications: Ethics and Identity in Design (0.5 Unit)
This class will bolster a student's ability to ask critical questions of themselves in their role as a designer when tackling complex social issues. Through in-depth class discussions and deep self-reflection, this class will provide intellectual rigor to the many conflicts of interests and perverse incentives that persist when designers enter the social sector.

DSGN 430-0 Product Management for Technology Companies: An Entrepreneurial Perspective (1 Unit)
This course, DSGN 430-0-1 Product Management, equips students with the frameworks, tools and direct experience to become effective product managers. The course focuses equally on product management in technology startup firms and product management in large technology firms. Reserved for students in the EDI program.

DSGN 440-0 Performance and Technology: Composition Workshop (1 Unit)
In this course students will use basic mechatronics to create compelling movement-based performances. The course will involve workshop exploration of technologies embedded in performance: robots, media, computer interface. Students will create performance projects and discuss theoretical and historical implications of technologies in performance. Hands-on making and engineering workshops will be incorporated to develop skills in technological crafts such as circuit design and fabrication, toward technologically enhanced performance.

DSGN 450-0 Differentiation by Design (1 Unit)
Introduces students to opportunities for innovation throughout the entire new product development process. Lectures supported by case studies, readings, relevant outside experts, and real world examples. Reserved for students in the EDI program.

DSGN 455-0 Design Strategy (1 Unit)
Introduces students to the power of design as a differentiator in the marketplace. Human centered design and strategic design thinking are leading the charge in meaningful innovation that consumers and business find relevant. This course is a highly interactive studio with real world examples, case studies, guest lectures from industry, class discussions, and storytelling, along with hands on design thinking exercises and assignments. Reserved for students in the EDI program.

DSGN 474-0 Brand and Design Leadership (1 Unit)
We will explore the brand, design, and leadership concepts: as separate notions, how they intersect and how different configurations can create value and even lead to similar outcomes. We will discuss various formal frameworks and contextualize them with real-world models, examples and stories. Guest speakers of diverse career backgrounds will share their own frameworks and stories. Reserved for students in the EDI program.

DSGN 495-0 Special Topics in Engineering Design (1 Unit)

DSGN 497-0 Advanced Topics in Engineering Design (0.5 Unit)

DSGN 499-0 Independent Research Project (0.5-2 Units)

DSGN 519-0 Responsible Conduct of Research Training (0 Unit)