

HANNAH HARCOURT ALLEN: PROPOSAL FOR A MAJOR IN

***USER EXPERIENCE DESIGN ENGINEERING***

NORTHWESTERN UNIVERSITY: MCCORMICK INTEGRATED ENGINEERING STUDIES

# **PURPOSE**

If you were to ask what my three favorite classes have been since coming to Northwestern, I could tell you the answer without a moment's hesitation: DSGN 308: Human Centered Product Design, DSGN 397: Visual Communication Design, and EECS 111: Fundamentals of Computer Science. These classes don't seem like they overlap very much, but they all have one thing in common: Design. My aim in creating my MIES major was to create a program that centered around design at the intersection of technology, art, innovation, and engineering.

Every single thing in the world has to be designed. Whether this be a system designed by a consultant, a product designed by an engineer, a website designed by a programmer, or a poster designed by an artist, it all involves a design process. Learning *how* to design by learning the design process is useful for anyone who is interested in any sort of ideation, creation, or engineering. Pursuing a major that combines design within different areas of study would increase a person's ability to think critically and would increase their awareness of how they interact with everything and everyone in the world.

This program cannot be pursued within any of the existing McCormick majors because the focal area falls at the intersection of multiple different programs. The content in this major is being pulled from the computer science, mechanical engineering, and Segal design departments and combined to give me a skill set in human computer interaction, human centered design, and engineering design. The *Human Computer Interaction Core* starts with a basic understanding of computer science fundamentals from an introductory EECS class. The rest of the classes in this core build on this introductory knowledge with technology/design project-based classes to develop real world skills. The *Human Centered Design Core* combines classes across different areas of design that all focus on designing for a user. This includes industrial design, UX design, product design, and graphic design, so I will have experience designing for users across a broad range of applications. The *Engineering Design Core* is made up of classes that help me develop the technical engineering skills like manufacturing and rapid prototyping. These classes give me the necessary skills to not only be able to design solutions but also be able to implement them.

I created this major because my ideal career would be working as an industrial designer or a graphic designer at a technology company like Apple or Google, and I didn't feel like any of the current majors offered at Northwestern would prepare me to market myself to jobs like these. I have designed this major so I would be prepared to go into any of the following fields: Industrial Design, Product Design, Graphic Design, or Front End Programming. I would most likely complete some sort of supplemental education after finishing my degree at Northwestern whether that be a program similar to Northwestern's EDI degree, a coding heavy masters program, or a graphic design certificate like the one offered at the School of the Art Institute of Chicago.

This major has the caliber of an existing McCormick degree because it meets the number of ABET math and science credits and the number of ABET engineering credits required for a degree from the McCormick School of Engineering. This major covers multiple areas of study, but it doesn't just require the introduction classes in these area but also the higher level classes to increase both the rigor and the depth into these topics. For example, the Human Computer Interaction Core starts with EECS 111 in which I learn Racket programming language which is an education language that gives me an introduction into coding as a concept. Next I'll take EECS 330 which uses those foundational coding skills to design technology interfaces to meet user's needs. EECS 313 and EECS 314 continue to teach me about how humans interact with technology by studying how technology affects the "broader physical, social, and cultural worlds" and how people interact with the world with and without technology to "design, create and evaluate technologies to support such interactions," respectively.

## **PROPOSED FOUR YEAR PLAN**

	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>
<b>Freshman</b>	STAT 202 SOCIO 101-6 EECS 111 PSYCH 110	DTC 1 EA 1 EECS 211 PSYCH 215	DTC 2 EA 2 MATH 230
<b>Sophomore</b>	EA 3 MATH 234 CHEM 110 IEMS 201	EA 4 CHEM 131/141 CIV E 216 DSGN 397	COMM_ST 102 MAT SCI 201 DSGN 308 ME 240 DSGN 240
<b>Junior</b>	ME 340-1 RELIGION 264 PHYS 135-2/136-2 ME 233	PSYCH 205 PSYCH 384 DSGN 300 ME 340-2 EECS 330	DSGN 346 DSGN 397 EECS 313 EECS 130 PSYCH 343
<b>Senior</b>	DSGN 297 DSGN 306 DSGN 395-1 PSYCH 221 ART 220	PHYS 135-3/136-3 EECS 314 DSGN 395-2 DSGN 320/305	

# BASIC ENGINEERING CURRICULUM

## Mathematics (4 units)

AP Calculus AB

AP Calculus BC

MATH 230: Differential Calculus of Multivariable Functions

MATH 234: Integral Calculus of Multivariable Functions

## Basic sciences (4 units)

CHEM 131/141: General Chemistry + Lab

PHYS 135-2,3/ PHYS 136-2,3: General Physics + Lab

## Engineering analysis (4 units) - 1 ABET Engineering Credit

GEN ENG 205-1,2,3,4: Engineering Analysis (1 eng)

## Design and communication (3 units) - 1 ABET Engineering Credit

DSGN 106- 1,2: Design Thinking and Communication (1 eng)

ENGLISH 106- 1,2: Writing in Special Contexts

COMM 102: Public Speaking

## Basic engineering (5 units) - 4 ABET Engineering Credit

ME 233: Electronics Design (1 eng)

CEE 216: Mechanics of Materials (1 eng)

MAT SCI 201: Introduction to Materials (1 eng)

IEMS 201: Intro to Stats

EECS 211: Fundamentals of Computer Science 2 (1 eng)

## Social sciences/Humanities (7 units)

PSYCH 110: Introduction to Psychology (*for minor*)

PSYCH 215: Psychology of Personality (*for minor*)

PSYCH 205: Research Methods in Psychology (*for minor*)

PSYCH 343: Psychology of Beauty (*for minor*)

PSYCH 384-0 Relationship Science (*for minor*)

RELIGION 265: American Religious History After the Civil War

ART 220: Intro to ~~Drawing~~ Painting

## Unrestricted electives (5 units)

STAT 202: Introduction to Stat (*for minor*)

CHEM 110: Quantitative Problem Solving

SOCIO 101-6: Freshman Seminar

PSYCH 212: Intro to Neuroscience (*for minor*)

DSGN 300: Designing your Life

# PROPOSED MAJOR CURRICULUM

**Major program (16.5 units)** - 15.05 ABET Engineering Credit

## *Human Computer Interaction Core*

EECS 111: Computer Science Fundamentals (1 eng)

EECS 130: Tools and Technology of the World Wide Web (1 eng)

EECS 330: Human Computer Interaction (.8 eng)

EECS 313: Tangible Interaction Design and Learning (1 eng)

EECS 314: Technology and Human Interaction (1 eng)

## *Human Centered Design Core*

DSGN 296 (.5): Visual Thinking for Design (.25 eng)

DSGN 306: UX Design (.75 eng)

DSGN 308: Human Centered Design (1 eng)

DSGN 320: Industrial Design (.5 eng) or DSGN 305: Service Design (1 eng)

DSGN 397 (.5): Engineering Portfolio (.25 eng) or Programming for Eng 230

DSGN 397: Visual Communication Design (.5 eng)

## *Engineering Design Core*

ME 240: Introduction to Manufacturing (1 eng)

ME 340-1: Computer Integrated Manufacturing (1 eng)

ME 340-2: Computer Integrated Manufacturing (1 eng)

DSGN 240 (.5): Solidworks (.5 eng)

DSGN 346: Design for Fabrication (1 eng)

## *Senior Capstone*

DSGN 395-1: MaDE Capstone (1 eng)

DSGN 395-2: MaDE Capstone (1 eng)