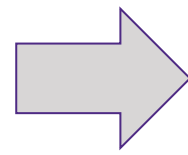# Agenda
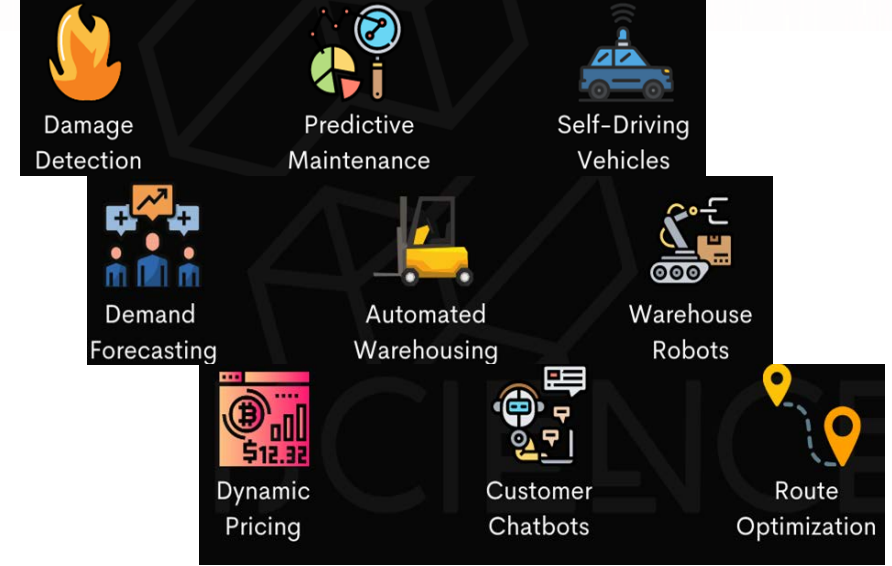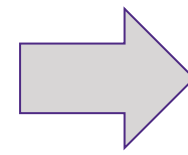
- Program Overview
- Eligibility
- Curriculum Requirements
- Applications & Admissions
- Q&A

Data-Driven Applications are Everywhere!

E-commerce
- Identifying Consumers
- Recommending Products
- Analyzing Reviews

Manufacturing
- Predicting Potential Problems
- Monitoring Systems
- Automating Manufacturing Units
- Maintenance Scheduling
- Anomaly Detection

Banking
- Fraud Detection
- Credit Risk Modeling
- Customer Lifetime Value

Healthcare
- Medical Image Analysis
- Drug Discovery
- Bioinformatics
- Virtual Assistants

Transport
- Self Driving Cars
- Enhanced Driving Experience
- Car Monitoring System
- Enhancing the safety of passengers

Finance
- Customer Segmentation
- Strategic Decision Making
- Algorithmic Trading
- Risk Analytics

Northwestern | ENGINEERING

Data Abstraction

Damage Detection · Predictive Maintenance · Self-Driving Vehicles
Demand Forecasting · Automated Warehousing · Warehouse Robots
Dynamic Pricing · Customer Chatbots · Route Optimization

Cloud computing · Programming · Visualization · Machine learning · A/B testing

Data collection · Version control · Data cleaning · Big data processing · Anomaly detection

Northwestern | ENGINEERING

Data Science Intern

United States
Full-time, Internship
You must create an Indeed account before continuing to the company website to apply

| Apply on company site | ♡ |

What You'll Bring (Objective Minimum Qualifications):

To be considered for a Data Scientist Intern position, you must possess the Objective Minimum Qualifications (OMQs) below. **Please ensure that your application clearly indicates that you meet these OMQs** , either on your resume and/or by uploading additional documents such as a transcript.

- Will be enrolled in a Bachelor's, Master's or PhD degree program in an applied business or quantitative field such as Statistics, Operations Research, Applied Mathematics, Computer Science, Economics, Business Analytics, or equivalent field during the 2023-2024 school year.
- Have completed **at least your junior year** toward your undergraduate degree, or higher, by summer 2023.
- Have no more than **12 months** of professional full-time work experience in the technology field (excluding internships, research and/or teaching assistant roles, and military experience).
- Have academic coursework, projects, internships, and/or research experience with tools needed to execute the more technical aspects of statistical data analysis, including proficiency (e.g., can complete projects without any assistance) in **at least one** of the following programming languages:
  - Python, Java, R, SQL, PL/SQL.
- Have experience through coursework, projects, internships, and/or research with **at least one** of the following libraries:
  - Numpy, Scipy, Matplotlib, SciKit, TensorFlow, PyTorch, Spark
- Have completed coursework, projects, internships, and/or research in **two or more** of the following:
  - Algorithms
  - Artificial Intelligence
  - Big Data Query
  - Data Mining
  - Data Modeling
  - Machine Learning
  - Statistical Inference/Analysis

Data Scientist/ML Engineer

Chicago, IL 60607
Full-time

| Apply now | ♡ |

Job   Company

Qualifications

- BS in Computer Science, Mathematics, Economics, Statistics or a related discipline
- Strong experience in object-oriented programming using Python
- Experience developing, training, and evaluating (supervised/unsupervised) machine learning models such as random forest, SVMs, Naive Bayes, gradient boosting and kNN
- Experience developing, training, and evaluating deep-learning models using deep learning frameworks such as TensorFlow/Keras or Pytorch
- Project experience in computer vision such as object detection, image classification, text localization, OCR and semantic segmentation
- Experience with Sagemaker, S3, GCP Compute Engine, CloudGPUs, Cloud Storage, OpenCV, Boto3
- Experience building models which have been deployed to production, edge deployment preferred
- Strong ability to solve problems and to structure and simplify complex tasks
- Willingness to continue personal development in to stay at the cutting edge of data science
- Ability to build a sense of trust and rapport that creates a comfortable and effective workplace

Program Objectives

- Computational and algorithmic skills to work with data.

- Practical and foundational knowledge to the data science lifecycle.

- Hands-on experience with on collecting, cleaning, and analyzing data

- Ability to harvest insights from data and think critically about data-driven decision making.

Who is Eligible to Apply

To apply for the next cohort you must

- Be a current McCormick undergraduate student

- Have completed EA 1 before the start of the Fall 2023 quarter.

- Have an expected graduation date no sooner than Winter 2025.
  - So that you can take required courses.
    - Data Foundations Course in Winter or Spring 2024
    - Data Studio Course in Winter or Spring 2025
  - *Limited spaces may be available for students graduating Spring 2024.*
    - Data Foundations Course in Winter 2024
    - Data Studio Course in Spring 2024

Students from ALL McCormick majors are welcome!

Curriculum Requirements Overview

The DSE Minor consists of 8 courses

- DSE Core: 4 courses

- Data Studio Sequence: 2 courses
  - DATA_ENG 200
  - DATA_ENG 300

- DSE Electives: 2 courses

Northwestern | ENGINEERING

Curriculum Requirements: DSE Core

- **One course in Statistics:**
  - BME 220, ChemE 312, CIV 306, IEMS 201, IEMS 303

- **One course in Machine Learning:**
  - CS 349, EE 475, or IEMS 304

  Courses in purple are on the basic engineering list (2021 catalog or before)

- **One course in Intro Programming:**
  - CS 150, CS 211, or CS 230

- **One course in Intermediate Programming/Algorithmic Thinking:**
  - CS 214 or CS 217

Curriculum Requirements: Data Studio Sequence

- **DATA_ENG 200: Foundations of Data Science**
  - Offered in Winter 2024, TTh 9:30-10:50; Spring 2024, TTh 12:30-1:50
  - Registration in one of these sections is required

- **DATA_ENG 300: Data Engineering Studio**
  - Offered in Winter 2025, TTh 12:30-1:50; Spring 2025, TTh 9:30-10:50
  - Registration in one of these is required, unless significant conflicts exist with major program

- If you can't enroll in these offerings, you are welcome to apply the following year.

DATA_ENG 200: Foundations of Data Science

This course will introduce the steps of the data science lifecycle and common tools and techniques for data science. Here are some covered topics from the previous offering:

- Surviving skills
- Preprocessing
- Basic analytics

Cloud computing   Programming   Visualization   Machine learning   A/B testing
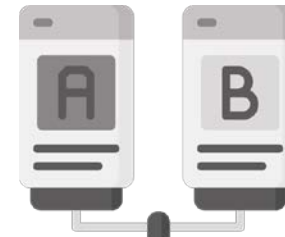
Data collection   Version control   Data cleaning   Big data processing   Anomaly detection

Northwestern | ENGINEERING
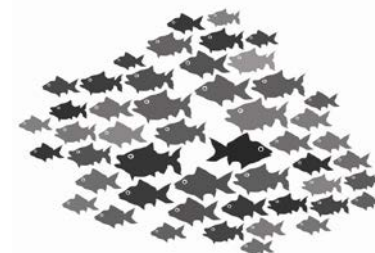
DATA_ENG 300: Data Engineering Studio

This course will teach students how to build a sustainable data science lifecycle. Here are some of the tentative topics:

- Machine learning
- Large scale processing
- Whole pipeline integration

Cloud computing   Programming   Visualization   Machine learning   A/B testing

Data collection   Version control   Data cleaning   Big data processing   Anomaly detection

Curriculum Requirements: DSE Electives

- Choose 2 electives
  - Advanced techniques in data science
  - Expanded foundations for data science techniques
  - Domain-specific application of data science and engineering

- List includes 300-level and 400-level courses from
  - BME, ChemE, CivE, CompSci, ElecE, ESAM, IEMS, MatSci, MechE

- Several choices accessible to students from all majors, without need for many prerequisites

- BMD_ENG 311-0 Computational Genomics
- BMD_ENG 395-0 Topics in Biomedical Engineering (Biomedical Applications in Machine Learning)
- CHEM_ENG 379-0 Computational Biology: Analysis and Design of Living Systems
- CIV_ENV 304-0 Civil and Environmental Engineering Systems Analysis
- CIV_ENV 377-0 Choice Modeling in Engineering
- CIV_ENV/MECH_ENG 413-0 Experimental Solid Mechanics
- CIV_ENV 473-0 Survey methods, data and analysis
- CIV_ENV 480-1 Travel Demand Analysis & Forecasting 1
- CIV_ENV 480-2 Advances in Travel Demand Analysis and Forecasting
- CIV_ENV 495-0 Selected Topics in Civil Engineering (Data Analytics for Transportation and Urban Infrastructure Applications)
- COMP_SCI 348-0 Introduction to Artificial Intelligence
- COMP_SCI 394-0 Agile Software Development
- COMP_SCI 396-0 Special Topics in Computer Science (Computing, Ethics, and Society)
- COMP_SCI 396-0 Special Topics in Computer Science (Deep Learning)
- COMP_SCI 396-0 Special Topics in Computer Science (Interactive Information Visualization)
- COMP_SCI 396-0 Special Topics in Computer Science (Social Networks Analysis)

- COMP_SCI 396-0 Special Topics in Computer Science (Visualization for Scientific Communication)
- COMP_SCI 397-0 Special Projects in Computer Science (Rapid Prototyping for Software Innovation)
- ELEC_ENG 328-0 Information Theory & Learning
- ELEC_ENG 373-0 Deep Reinforcement Learning
- ELEC_ENG 395-0 Special Topics in Electrical Engineering (Optimization Techniques for Machine Learning and Deep Learning)
- ELEC_ENG 424-0 Distributed Optimization
- ELEC_ENG 433-0 Statistical Pattern Recognition
- ELEC_ENG 335-0 Deep Learning Foundations from Scratch
- ES_APPM 345-0 Applied Linear Algebra
- ES_APPM 375-1 Quantitative Biology I: Experiments, Data, Models, and Analysis
- ES_APPM 375-2 Quantitative Biology II: Experiments, Data, Models, and Analysis
- ES_APPM 472-0 Introduction to the Analysis of RNA Sequencing Data
- ES_APPM 479-0 Data Driven Methods for Dynamical Systems
- IEMS 307-0 Quality Improvement by Experimental Design
- IEMS 308-0 Data Science and Analytics
- IEMS 313-0 Foundations of Optimization
- IEMS 340-0 Field Project Methods
- IEMS 341-0 Social Networks Analysis

- IEMS 351-0 Optimization Methods in Data Science
- MAT_SCI 391-0 Process Design
- MECH_ENG 301-0 Introduction to Robotics Laboratory
- MECH_ENG 329-0 Mechanistic Data Science
- MECH_ENG 341-0 Computational Methods for Engineering Design
- MECH_ENG/CIV_ENV 413-0 Experimental Solid Mechanics
- MECH_ENG 441-0 Engineering Optimization for Product Design and Manufacturing
- MECH_ENG 469-0 Machine Learning and Artificial Intelligence for Robotics
- MECH_ENG 495-0 Selected Topics in Mechanical Engg (Sensory Navigation and Machine Learning for Robotics)

Northwestern | ENGINEERING
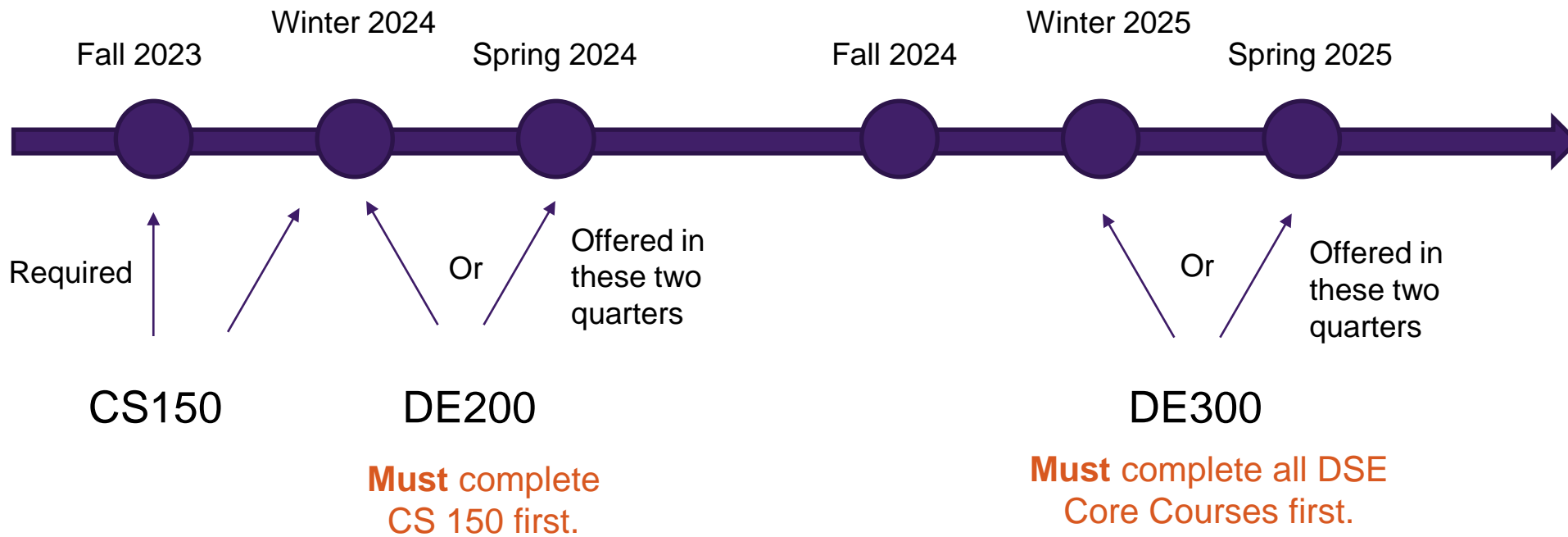
Limitations on Double-Counting

- The minor must include **five** courses that are not used towards other major or minor requirements.
  - "Major" means the **16**-unit major requirements

    Major in purple on MAS

  - Courses used for other McCormick requirements—unrestricted electives, basic engineering, etc. are not considered part of major requirements.

- The minor must include **four** courses that are not used towards other major or minor requirements.
  - "Major" means the **21**-unit major requirements

    Major in purple on MAS

  - Courses used for other McCormick requirements—unrestricted electives, etc. are not considered part of major requirements.

Limitations on Double-Counting

- Many choices in the DSE core can count towards basic engineering
  - Might be restricted by basic engineering requirements for your major.
  - Again—choices counted towards basic engineering are **not** considered count towards your major.

- Major-specific guidance can be found on the DSE website
  - Available for 2021 and prior catalog year for all McCormick majors.
  - Available for 2022 and later catalog year for most programs

Applications and Admissions

Applications are now open.

https://bit.ly/ApplyDSE2023

- **Aug 31:** Applications close
- **Sept 6:** First-round admissions decisions released
- **Sept 13:** Deadline to confirm participation
- **Sept 15:** Waitlist admissions decisions released
- **Sept 19:** Fall 2023 classes begin; deadline for waitlisted students to confirm.

- **Look for reminder emails during Summer 2023**

Northwestern | ENGINEERING

We look forward to seeing applications from you all!

Stay connected?

- For more DSE related activities/newsletter, etc.
- Scan here and fill in your email:

Northwestern | ENGINEERING

Questions?

Visit dse.mccormick.northwestern.edu

Email dse@northwestern.edu
Or
dseadmin@u.northwestern.edu