Northwestern | McCORMICK SCHOOL OF ENGINEERING
Data Science and Engineering

Guidance for Applied Math Majors

- The guidance here is based on the 2020 Applied Math degree requirements. You can find Data Science & Engineering (DSE) Minor curriculum details on the DSE website.

- The DSE Minor requires 8 courses. McCormick requires that each minor consist of 5 courses that are **not** used towards any of your major requirements.
  - "Major Requirements" are those designated as "Major Program (16 units)" in the catalog. They are also designated with purple banners in your MAS degree audit:

  - You can count up to 3 courses towards both DSE minor and your major requirements.
  - Basic Engineering and Unrestricted Electives are not considered major requirements.
  - Talk to your advisor about how to choose DSE electives that can apply towards your Applied Math major requirements.

- Double counting rules also apply to minors and certificates.
  - This means your DSE minor must use 5 courses that do not apply to your major program, or to any other minors and certificates.
  - Take advantage of flexibility in some of the minor requirements.
    Example: if you have credit for both COMP_SCI 150 and COMP_SCI 211, you can use either of them to fulfill the programming foundations requirement.

- Be mindful of prerequisites, both for DSE Core Courses and for DSE Electives. Declaration of the minor does not imply that any prerequisites will be waived for you.

- Your five basic engineering courses must cover four different categories (noted in the tables below). Some DSE electives can also apply towards basic engineering:
  - CIV_ENV 304 and IEMS 313: *Systems Engineering*

The guides below are two possible paths among many for Applied Math majors who are pursuing the DSE minor. Other paths are possible—talk to your advisor or email us at dse@northwestern.edu.

Using ES_APPM courses from DSE Approved Electives

DSE Minor Requirements	Course Selection	How does this count for my major?		Notes
		Not Major Requirement	Major Requirement	
Data Science Core: 4 courses				
Statistics Foundations	IEMS 303		Yes*	Double Count
Programming Foundations	COMP_SCI 211 or 230	Basic engineering *Computer Programming*		Required for AM
Intermediate Programming	COMP_SCI 217	Basic engineering *Computer Programming*		
Applied Machine Learning	IEMS 304 or CS 349	Unrestricted Elective		
Data Science Studio Courses: 2 courses				
	DATA_ENG 200	Unrestricted Elective		
	DATA_ENG 300	Unrestricted Elective		
Electives: 2 courses				
	ES_APPM 345		Yes	Double Count
	ES_APPM 375-1		Yes	Double Count

**Only a double count if used for ESAM statistics requirement*

Using other courses from DSE Approved Electives

DSE Minor Requirements	Course Selection	How does this count for my major?		Notes
		Not Major Requirement	Major Requirement	
Data Science Core: 4 courses				
Statistics Foundations	IEMS 303	Basic engineering *Prob, Stats, and QC*		
Programming Foundations	COMP_SCI 211 or 230	Basic engineering *Computer Programming*		Required for AM
Intermediate Programming	COMP_SCI 217	Basic engineering *Computer Programming*		
Applied Machine Learning	IEMS 304 or CS 349		Tech Elective	Double Count
Data Science Studio Courses: 2 courses				
	DATA_ENG 200	Unrestricted Elective		
	DATA_ENG 300		Tech Elective or Concentration	Double Count
Electives: 2 courses				
	Two DSE Approved Electives		Tech Elective or Concentration	Double Count
		Unrestricted Elective		