Northwestern | McCORMICK SCHOOL OF ENGINEERING

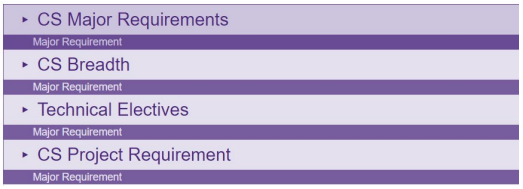
Data Science and Engineering Minor

Guidance for Computer Science Majors

- The guidance here is based on the 2020 CS 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 be used towards your CS breadth requirements or tech electives.

- 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 349 and IEMS 304, you can use either of them to fulfill the machine learning 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, IEMS 313: *Systems Engineering*
  - ES_APPM 345: *Computer Architecture and Numerical Methods*

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The guides below represent some possible paths for CS majors who are pursuing the DSE minor. Other paths are possible—talk to your advisor or email us at dse@northwestern.edu.

Using COMP_SCI 349 or ELEC_ENG 375 as the Applied Machine Learning course:

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 201 or 303	Basic engineering *Prob, Stat, Quality Control*		Required for CS
Programming Foundations	COMP_SCI 211	Basic engineering *Computer Programming*		Required for CS
Intermediate Programming	COMP_SCI 214		Yes	Double Count
Applied Machine Learning	COMP_SCI 349 or ELEC_ENG 375		Yes*	Double Count
Data Science Studio Courses: 2 courses				
	DATA_ENG 200	Unrestricted Elective		
	DATA_ENG 300	Unrestricted Elective		
Electives: 2 courses				
	CIV 304, ESAM 345, or IEMS 313	Basic Engineering		
	DSE Approved Elective		Yes*	Double Count

**Breadth or Technical Elective*

Using IEMS 304 as the Applied Machine Learning course:

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 201 or 303	Basic engineering *Prob, Stat, Quality Control*		Required for CS
Programming Foundations	COMP_SCI 211	Basic engineering *Computer Programming*		Required for CS
Intermediate Programming	COMP_SCI 214		Yes	Double Count
Applied Machine Learning	IEMS 304	Unrestricted Elective		
Data Science Studio Courses: 2 courses				
	DATA_ENG 200	Unrestricted Elective		
	DATA_ENG 300	Unrestricted Elective		
Electives: 2 courses				
	Two DSE Approved Electives		Yes*	Double Count
			Yes*	Double Count

**Breadth or Technical Elective*