APPLIED MATHEMATICS DEGREE

Students must also complete the Undergraduate Registration Requirement (https://catalogs.northwestern.edu/undergraduate/requirements-policies/undergraduate-registration-requirement/) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)	
4 units of basic science: [2]	
PHYSICS 135-2 & PHYSICS 135-3	General Physics and General Physics
2 units chosen from McCormick-approved basic science courses	
4 engineering analysis and computer proficiency courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)	
3 design and communication courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)	
7 social sciences/humanities courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)	
5 unrestricted electives (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)	

Major Program (21 units)

Course	Title
5 basic technical courses	
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
or COMP_SCI 211-0	Fundamentals of Computer Programming II
Plus 4 courses from at least 3 different McCormick departments, Mathematics, Statistics, and Data Science (at 200-level or above)	
7 engineering sciences and applied mathematics courses	
ES_APPM 311-0	Methods of Applied Mathematics [3]
ES_APPM 312-0	Complex Variables
or MATH 325-0	Complex Analysis
ES_APPM 322-0	Applied Dynamical Systems
ES_APPM 346-0	Modeling and Computation in Science & Engineering
ES_APPM 345-0	Applied Linear Algebra
or MATH 334-0	Linear Algebra: Second Course
ES_APPM 421-1	Models in Applied Mathematics
1 additional unit of any 300- or 400-level ES_APPM course	
1 probability and statistics course chosen from the options below [4]	
ELEC_ENG 302-0	Probabilistic Systems
IEMS 302-0	Probability (formerly IEMS 202-0)
IEMS 303-0	Statistics
MATH 310-1	Probability and Stochastic Processes
MATH 310-2	Probability and Stochastic Processes
MATH 310-3	Probability and Stochastic Processes
1 additional probability and statistics course chosen from the options above or 1 course chosen from the options below	
IEMS 310-0	Operations Research
IEMS 313-0	Foundations of Optimization
1 mathematical modeling course chosen from the options below	
ES_APPM 370-1	Introduction to Computational Neuroscience
or ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
or ES_APPM 399-0	Projects
or ES_APPM 495-0	Selected Topics in Applied Mathematics
ES_APPM 399-0, ES_APPM 495-0 , or other modeling course subject to department pre-approval	
4 courses in engineering or the sciences at the 300 level or higher leading to an approved concentration [4]	
2 technical electives at the 300 level or higher in engineering, science, or mathematics [4]	

1 See general requirements (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext) for details.

2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics Laboratory for ISP or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics Laboratory for ISP or PHYSICS 136-3 General Physics Laboratory.

3 Since ES_APPM 311-0 Methods of Applied Mathematics is a required, Math 351 cannot be used to satisfy any ESAM degree requirements due to content overlap with ES_APPM 311-0.

4 Only one of the courses IEMS 302, Math 310-1 and ELEC_ENG 302 can be taken for credit.