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)

Course | Title
---|---
4 mathematics courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)
4 units of basic science: 
- 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
- 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
2 courses chosen from the options below
- ELEC_ENG 302-0 Probabilistic Systems
- IEMS 202-0 Probability
- IEMS 303-0 Statistics
- IEMS 310-0 Operations Research
- IEMS 313-0 Foundations of Optimization
- MATH 310-1 Probability and Stochastic Processes
- MATH 310-2 Probability and Stochastic Processes
- MATH 310-3 Probability and Stochastic Processes
1 mathematical modeling course chosen from the options below
- ES_APPM 370-1 Introduction to Computational Neuroscience
- ES_APPM 375-1 Quantitative Biology I: Experiments, Data, Models, and Analysis
- ES_APPM 399-0 Projects
- ES_APPM 495-0 Selected Topics in Applied Mathematics (subject to department approval, one whole unit or two half units)

Other modeling course subject to department approval
4 courses in engineering or the sciences at the 300 level or higher leading to an approved concentration
2 technical electives at the 300 level or higher in engineering, science, or mathematics

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 for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory 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.