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.

Course Requirements (48 units)

Core Courses (32 units)
- 4 mathematics courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)
- 4 engineering analysis and computer proficiency courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)
- 4 units of basic science, \(^1\)
  - PHYSICS 135-2 General Physics
  - & PHYSICS 135-3 General Physics
  - 2 units chosen from McCormick-approved basic science courses
- 3 design and communication courses (https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext)
- 5 basic engineering courses:
  - COMP_SCI 230-0 Programming for Engineers
  - or COMP_SCI 211-0 Fundamentals of Computer Programming II
  - 4 courses from at least three of the following areas: Computer architecture and numerical methods, Electrical science, Fluids and solids, Materials science and engineering, Systems engineering and analysis, Thermodynamics (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 (16 units)

- 7 engineering sciences and applied mathematics courses:
  - ES_APPM 311-0 Methods of Applied Mathematics
  - 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 unit of any 300- or 400-level ES_APPM course
  - 2 courses chosen from:
    - 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:
    - 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 in one of the following areas:
- Engineering
- Mathematical social sciences (e.g., economics)
- Mathematics (e.g., discrete mathematics or analysis)
- Numerics
- The sciences
- 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 Maximum of 3 basic science units may come from any one area.

3 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.