PROGRAM C SPECIALIZATION
BIOSTATISTICS B.A./B.S.
2023

Mathematics plays an essential role in studying biological systems and advancing medicine. Mathematical models of biological systems allow testing assumptions that may not be accessible experimentally and generate innovative predictions that can lead to future research. The Department of Mathematics at the University of Iowa has outstanding faculty with a strong teaching and research record in Mathematical Biostatistics.

The specialization of Biostatistics will help students to think about biological systems mathematically and statistically. Students will obtain essential skills in mathematical and statistical analysis applicable to biology.

This program requires 5 (6 if Option #2 on p.1 below is used) core courses in Mathematics, one required course in Public Health, and at least 5 electives for B.A. and at least 7 electives for B.S. in Mathematics, Statistics, and/or Biostatistics. All Program C degree requirements on upper-level math courses, mathematics courses, math residency, and 3-4 s.h. electives apply (see pp.1-3).

Students who declared math major for the first time in Fall 2023 or later at the UI must use this template. Students who declared math major by Summer 2023 at the UI may choose to follow this template or the previous template.

Course Requirements

1. **Five core math courses (at least 20 s.h. total for both B.A and B.S.)**
   - Calculus I and Calculus II, 8 s.h.
     NOTE: Either sequence MATH:1550-1560 or MATH:1850-1860 is acceptable. The coverages of these two sequences are different so that students should not mix and match unless there is a strong need with good preparation. Advanced placement (AP), CLEP, and credits obtained through the Mathematics Incentive Program are acceptable for all or part of this calculus requirement.
   - MATH:2700 Introduction to Linear Algebra, 4 s.h.
   - MATH:2850 Calculus III, 4 s.h.
   - MATH:3770 Fundamental Properties of Spaces and Functions I, 4 s.h.
   Higher-level math courses may be used to substitute for core math courses if approved by the Math Department Director of Undergraduate Study in advance.
2. **Or, six core math courses for engineering track (at least 20 s.h. total for both B.A and B.S.)**
   - MATH:1550 Engineering Math I Single Variable Calculus, 4 s.h.
   - MATH:1560 Engineering Math II Multivariable Calculus, 4 s.h.
   - MATH:2550 Engineering Math III Matrix Algebra, 2 s.h.
   - MATH:2560 Engineering Math IV Differential Equations, 3 s.h.
   - MATH:3550 Engineering Math V Vector Calculus, 3 s.h.
   - MATH:3770 Fundamental Properties of Spaces and Functions I, 4 s.h.

Higher-level math courses may be used to substitute for core math courses if approved by the Math Department Director of Undergraduate Study in advance.

3. **Required CPH course (3 s.h. for both B.A. and B.S.)**
   - CPH:1400 Fundamentals of Public Health

4. **Five elective courses for B.A.**
   - Select at least 3 courses from Group I.
   - Of these 3 courses, at least one course must be an upper-level math course as marked by (U).
   - Select at least 2 courses from Group II.
   - Of these 2 courses, at least one must be a BIOS course and at least one must be a STAT course.

5. **Seven elective courses for B.S.**
   - Select at least 4 courses from Group I.
   - Of these 4 courses, at least 2 courses must be upper-level math courses as marked by (U).
   - Select at least 3 courses from Group II.
   - Of these 3 courses, at least one must be a BIOS course and at least one must be a STAT course.
   - If a student attempts an Undergrad-to-Grad (U2G) program in Biostatistics, STAT:4100-4101 and BIOS:5710-5720-5730 are required.

6. **Group I: math courses**
   - MATH:3600 Introduction to Ordinary Differential Equations.
   - MATH:3800 Elementary Numerical Analysis.
   - MATH:4220 Fourier Analysis and Applications. (U)
   - MATH:4700 Partial Differential Equations and Applications. (U)
   - MATH:4740 Large Data Analysis. (U)
   - MATH:4820 Optimization Techniques. (U)

7. **Group II: statistics and biostatistics courses**
   - STAT:2010 Statistical Methods and Computing.
   - STAT:3200 Applied Linear Regression.
   - STAT:3210 Experimental Design and Analysis.
   - STAT:4100 Mathematical Statistics I.
   - STAT:4101 Mathematical Statistics II.
   - BIOS:4120 Introduction to Biostatistics.
   - BIOS:5120 Regression & ANOVA in Health Sciences.
   - BIOS:5310 Research Data Management.
   - BIOS:5510 Biostatistical Computing.
   - BIOS:5710 Biostatistical Methods I.
   - BIOS:5720 Biostatistical Methods II.
   - BIOS:5730 Biostatistical Methods in Categorical Data.

8. **Residency requirement of the Math Department (for both B.A. and B.S.)**
   - Every math major must earn at least 15 s.h. at the UI in courses offered by the Department of Mathematics or cross-listed with a MATH-prefixed course.

9. **Plan of study**

- Every Program C student must file a Plan of Study before the start of their senior year. With the help of their advisor, a student prepares a list of courses as their Plan of Study according to Requirements 1-8 above. With advisor's approval, this Plan of Study is then submitted to the Math Department Director of Undergraduate Study for approval. Approved Plan of Study will be uploaded and appear in MyUI.
- If a student needs to change courses, a new Plan of Study must be submitted.
- Please use this [Fillable PDF Form for Plan of Study for Program C](#).

10. **Math Department and college's requirements**
    - Students earning a degree in mathematics must also satisfy the [Math Department's rules](#) and the [requirements of the College of Liberal Arts and Sciences](#).
    - More information about CLAS regulations can be found in the University of Iowa General Catalog.