Mathematics, BS

Bachelor of Science students majoring in mathematics enroll in one of these programs: Program A is for students who plan to work in business or government or pursue graduate study in mathematics; Program B is for students who seek secondary school teaching licensure; and the program in math with a related specialization may be especially appropriate for students who plan to seek a math-related job after earning the bachelor's degree rather than going on to graduate study. Defined areas of specialization include business (economics, finance, or risk management and insurance), data sciences (biostatistics, computer science, data science, or statistics and actuarial science), and physical sciences (biochemistry, biomathematics, chemistry, or physics). Program C is also available for students who wish to design their own area of specialization, like engineering.

Learning Outcomes

Math majors will be able to:

- give correct, logical mathematical proofs using mathematical terminology and hypotheses;
- reason logically and quantitatively using algebraic, analytic, and numerical methods;
- incorporate mathematical ideas and reasoning into well-written English; and
- model and analyze problems in pure mathematics and in other disciplines.

Transfer From Engineering to Mathematics

Certain engineering students who have completed MATH:1550 Engineering Calculus I, MATH:1560 Engineering Calculus II, MATH:2550 Engineering Matrix Algebra, MATH:2560 Engineering Differential Equations, or MATH:3550 Engineering Vector Calculus may count these courses toward the major in mathematics. See the Department of Mathematics website.

Requirements

The Bachelor of Science with a major in mathematics requires a minimum of 120 s.h., including at least 41–56 s.h. of work for the major. Total credit for the major depends on a student's choice of Program A, B, C, or a related specialization (business, data sciences, or physical sciences). Students must maintain a grade-point average of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences GE CLAS Core.

All students complete the post-calculus mathematics requirement, the upper-level mathematics requirement, and the requirements for Program A, B, or C, or a related specialization. Students must complete a two-semester sequence of MATH:1850 Calculus I and MATH:1860 Calculus II. Students in certain subtracks or Program C may be able to substitute another two-course calculus sequence; see information for specific specializations below. Advanced placement credit, CLEP credit, and credit granted through the Mathematics Incentive Program are accepted for all or part of the calculus requirement.

Students may count up to 56 s.h. of Department of Mathematics coursework (prefix MATH) toward credit required for the Bachelor of Science degree. For policies concerning transfer credit, correspondence credit, credit by examination, cumulative grade-point average, general rules relating to regression and duplication, and so forth, see For Undergraduate Students on the College of Liberal Arts and Sciences website.

For information about duplication, regression, and use of the second-grade-only option for mathematics courses, contact the Department of Mathematics or visit the Department of Mathematics website. The website also provides details about schedule planning and career options for mathematics students. For more information on admission, financial support, employment opportunities, the faculty, facilities, and other topics, visit the Department of Mathematics or the University of Iowa website.

The BS with a major in mathematics requires the following coursework.

Requirements	Hours
Post-Calculus Mathematics Courses	
Upper-Level Mathematics Courses	
Program Requirements	41-56

Post-Calculus Mathematics Courses

At least 15 s.h. of post-calculus mathematics courses (prefix MATH) applied toward the major must be completed at the University of Iowa; students may not count transfer courses or credit by exam toward this requirement.

Post-calculus courses in the Department of Mathematics are numbered 2000 or above, excluding MATH:3700, MATH:3996, MATH:3997, MATH:4010, and MATH:4020.

Upper-Level Mathematics Courses

Students must take at least two upper-level mathematics courses (three in Program A) for the BS degree. Upper-level mathematics courses include MATH:3900 Introduction to Mathematics Research and courses numbered 4000 or above, excluding MATH:4010, MATH:4020, and MATH:4120.

No courses from other departments can be counted as upper-level mathematics courses unless they are cross-referenced with an upper-level mathematics course (prefix MATH).

Program A

Program A is primarily for students who plan to work in business or government or to pursue graduate study in mathematics.

Program A: Core Courses

Students complete the following core courses.

Course #	Title	Hours
MATH:1850 & MATH:1860	Calculus I and Calculus II	8
MATH:2700	Introduction to Linear Algebra	4
MATH:2850	Calculus III	4
MATH:3600	Introduction to Ordinary Differential Equations	3

MATH:3720	Introduction to Abstract Algebra	4
MATH:3770	Foundations of Analysis	4

More advanced courses may be substituted for the core courses with Department of Mathematics approval.

Program A: Electives

Students complete six electives (18–24 s.h.), including at least four courses in the Department of Mathematics (prefix MATH). Of these four courses, at least three must be upper-level mathematics courses.

Mathematics

Students may choose from mathematics courses numbered MATH:2150, MATH:3800, or courses above MATH:3800, excluding MATH:4010 and MATH:4020.

Computer Science

Students may choose computer science courses numbered CS:1210 through CS:4740, excluding CS:3210, CS:3910, CS:3980, and CS:3990.

Statistics and Actuarial Science

Students may choose statistics courses numbered STAT:2020, STAT:3100 through STAT:4740, or STAT:5100 through STAT:5120, excluding STAT:3510, STAT:4143, and STAT:4200.

Among the courses previously listed, only one of the following three courses can be counted toward the elective requirement: STAT:2020, STAT:3100, or STAT:3120. None of these courses can be counted as credit earned toward graduation if taken after STAT:4100 owing to regression policies.

Students may choose actuarial science courses numbered ACTS:3080 and ACTS:4130 through ACTS:4380.

Program B

Program B is intended for students seeking secondary school teaching licensure. Students who wish to earn teaching licensure in addition to earning a Bachelor of Science with a major in mathematics must also complete the Teacher Education Program (TEP); see the section titled "Teacher Licensure."

Program B: Core Courses

Students complete the following core courses.

Course #	Title	Hours
MATH:1850 & MATH:1860	Calculus I and Calculus II	8
MATH:2150	Foundations of Geometry	3
MATH:2700	Introduction to Linear Algebra	4
MATH:2850	Calculus III	4
MATH:3720	Introduction to Abstract Algebra	4
MATH:3770	Foundations of Analysis	4
MATH:4050	Introduction to Discrete Mathematics	3
or MATH:4060	Discrete Mathematical Models	

CS:1210	Computer Science I: Fundamentals	4
STAT:3120	Probability and Statistics	4

More advanced courses may be substituted for the core courses with Department of Mathematics approval.

Program B: Electives

Students in Program B must take at least three additional Department of Mathematics post-calculus courses (9–12 s.h.), including two chosen from MATH:3900 and courses numbered 4000 or above, excluding MATH:4010 and MATH:4020. Post-calculus courses must avoid duplication and regression with the core math courses, particularly when engineering mathematics courses are considered. With the department's approval, capable students are encouraged to substitute more advanced courses in the same subject area for any of the electives. The Department of Mathematics website offers advice on course selection.

Teacher Licensure

Students interested in teaching in elementary and/or secondary schools should seek admission to the Teacher Education Program (TEP) in the College of Education.

To qualify for licensure in secondary teaching, students in the TEP complete a degree in education as well as a related College of Liberal Arts and Sciences degree. See Apply on the College of Education website for details on requirements and deadlines for applying to the College of Education and about TEP choices of majors leading to licensure.

Students who wish to earn teacher licensure should choose Program B.

Program in Math With a Related Specialization

The Department of Mathematics encourages students of other majors to take more mathematics courses and attempt a BA or BS secondary major, or a secondary degree if their first major is outside CLAS, in mathematics. The program in math with a related specialization offers a curricular path to achieve this goal. Students complete core courses, mathematics electives, and subtrack requirements.

The program in math with a related specialization enables students to declare a concentration in a mathematics-related area. Options include specializations in business (subtracks in economics, finance, and risk management and insurance), data sciences (subtracks in biostatistics, computer science, data science, and statistics and actuarial science), and physical sciences (subtracks in biochemistry, biomathematics, chemistry, and physics). Students may declare one of these three defined areas of specialization and must complete requirements for one subtrack. They may also propose other plans of study, which would be categorized under Program C. An individualized plan of study must be approved by the Department of Mathematics prior to the start of the student's final year.

Business, Data Sciences, and Physical Sciences: Core Courses

Students complete the following core mathematics courses. Students pursuing the biostatistics subtrack of the data sciences specialization should refer to the following section titled "Biostatistics Subtrack" for additional information about an alternative set of core courses. Students

in the biomathematics subtrack of the physical sciences specialization should refer to the following section titled "Biomathematics Subtrack" rather than the list below.

Course #	Title	Hours
One of these sequences:		
MATH:1850 & MATH:1860	Calculus I and Calculus II	8
MATH:1550 & MATH:1560	Engineering Calculus I and Engineering Calculus II	8
Both of these:		
MATH:2700	Introduction to Linear Algebra	4
MATH:2850	Calculus III	4
One of these:		
MATH:3720	Introduction to Abstract Algebra	4
MATH:3770	Foundations of Analysis (students in the biostatistics subtrack must take MATH:3770)	4

If students complete both MATH:3720 and MATH:3770, one may count toward core courses and the other toward the elective requirement described below.

More advanced courses may be substituted for the core courses with Department of Mathematics approval.

Business, Data Sciences, and Physical Sciences: Mathematics Electives

Students must also take four elective courses (3–4 s.h. each), including at least two upper-level math courses. Mathematics elective options include mathematics courses (prefix MATH) numbered MATH:3600–MATH:5810, excluding MATH:3700, MATH:3996, MATH:3997, MATH:4010, MATH:4020, and MATH:4120.

When a subtrack requires post-calculus mathematics courses, those courses may also count as mathematics electives, with the exception of the physics subtrack of the physical sciences specialization. See the following section titled "Physics Subtrack" for more information.

Business Specialization

Economics Subtrack

The business specialization with an economics subtrack requires the following four courses.

Course #	Title	Hours
All of these:		
CS:1210	Computer Science I: Fundamentals	4
ECON:3100	Intermediate Microeconomics	3
ECON:3150	Intermediate Macroeconomics	3
STAT:3120	Probability and Statistics	4

Finance Subtrack

The business specialization with a finance subtrack requires the following four courses.

Course #	Title	Hours
This course:		
FIN:3000	Introductory Financial Management	3
One of these:		
FIN:3200	Investment Management	3
FIN:3300	Corporate Finance	3
Two of these:		
ACCT:3020	Financial Accounting and Reporting	3
FIN:3200	Investment Management (if not taken for the previous requirement)	3
FIN:3300	Corporate Finance (if not taken for the previous requirement)	3
FIN:3400	Principles of Risk Management and Insurance	3
A 3-4 s.h. finance course (prefix FIN) that counts toward the BBA in finance		3,4

Risk Management and Insurance Subtrack

The business specialization with a risk management and insurance subtrack requires the following four courses.

Course #	Title	Hours
Both of these:		
FIN:3000	Introductory Financial Management	3
FIN:3400	Principles of Risk Management and Insurance	3
Two of these:		
FIN:4420	Property and Liability Insurance	3
FIN:4430	Life and Health Insurance	3
FIN:4440	Employee Benefit Plans	3
FIN:4450	Risk Modeling	3

Data Sciences Specialization

Biostatistics Subtrack

Biostatistics: Alternative Core Courses

Students may complete five core courses as previously listed, or they may complete the six core courses listed below.

Course #	Title	Hours
All of these:		
MATH:1550	Engineering Calculus I	4
MATH:1560	Engineering Calculus II	4
MATH:2550	Engineering Matrix Algebra	2
MATH:2560	Engineering Differential Equations	3
MATH:3550	Engineering Vector Calculus	3
MATH:3770	Foundations of Analysis	4

Biostatistics: Additional Required Courses

The data sciences specialization with a biostatistics subtrack requires the following eight courses.

Course #	Title	Hours
This course:		
CPH:1400	Fundamentals of Public Health	3

Four of these, with at least two courses numbered 4000 or above:		
MATH:3600	Introduction to Ordinary Differential Equations (if student has not taken MATH:2560 as a core course)	3
MATH:3800	Introduction to Numerical Methods	3
MATH:4220	Fourier Analysis and Applications	3
MATH:4700	Partial Differential Equations and Applications	3
MATH:4820	Optimization Techniques	3
Three of these, with at least one course in biostatistics (prefix BIOS) and at least one course in statistics (prefix STAT):		
BIOS:4120	Introduction to Biostatistics	3
BIOS:5120	Regression Modeling and ANOVA in the Health Sciences	3
BIOS:5310	Research Data Management	3
BIOS:5710	Biostatistical Methods I	4
BIOS:5720	Biostatistical Methods II	4
BIOS:5730	Biostatistical Methods in Categorical Data	3
STAT:2010	Statistical Methods and Computing	3
STAT:3200	Applied Linear Regression	3
STAT:3210	Experimental Design and Analysis	3
STAT:4100	Statistical Inference I	3
STAT:4101	Statistical Inference II	3

Computer Science Subtrack

The data sciences specialization with a computer science subtrack requires four electives in computer science (prefix CS) numbered CS:1210–CS:4740, excluding CS:2110, CS:3010, CS:3210, CS:3910, CS:3980, CS:3990, and CS:3999.

Data Science Subtrack

The data sciences specialization with a data science subtrack requires the following four courses.

Course #	Title	Hours
Computer Science Electives		
Two of these:		
CS:3330	Algorithms	3
CS:4400	Database Systems	3
CS:4470	Health Data Analytics	3
CS:5430	Machine Learning	3
CS:5630	Cloud Computing Technology	3
May include one of these:		
CS:1210	Computer Science I: Fundamentals	4
CS:2110	Programming for Informatics	4
CS:2230	Computer Science II: Data Structures	4
Statistics Electives		
Two of these:		

Course #	Title	Hours
STAT:2010	Statistical Methods and Computing	3
STAT:3100	Introduction to Mathematical Statistics I	4
STAT:3200	Applied Linear Regression	3
STAT:3210	Experimental Design and Analysis	3
STAT:4520	Bayesian Statistics	3
STAT:4540	Statistical Learning	3
STAT:4560	Statistics for Risk Modeling I	3
STAT:4580	Data Visualization and Data Technologies	3
STAT:5810	Research Data Management	3

Statistics and Actuarial Science Subtrack

The data sciences specialization with a statistics and actuarial science subtrack requires the following four courses.

Course #	Title	Hours
Four of these:		
ACTS:3080	Mathematics of Finance I	3
ACTS:4130	Quantitative Methods for Actuaries	3
ACTS:4150	Fundamentals of Short-Term Actuarial Mathematics	3
ACTS:4180	Life Contingencies I	3
ACTS:4280	Life Contingencies II	3
STAT:2010	Statistical Methods and Computing	3
STAT:3101	Introduction to Mathematical Statistics II	3
STAT:3200	Applied Linear Regression	3
STAT:3210	Experimental Design and Analysis	3
STAT:3620	Quality Control	3
STAT:4100	Statistical Inference I	3
STAT:4101	Statistical Inference II	3
STAT:4520	Bayesian Statistics	3
STAT:4740	Large Data Analysis	3
STAT:5100	Statistical Inference I	3
STAT:5101	Statistical Inference II	3
STAT:5120	Mathematical Methods for Statistics	3
May count one of these if taken before STAT:4100		
STAT:2020	Probability and Statistics for the Engineering and Physical Sciences	3
STAT:3100	Introduction to Mathematical Statistics I	4
STAT:3120	Probability and Statistics	4

Physical Sciences Specialization

Biochemistry Subtrack

The physical sciences specialization with a biochemistry subtrack requires the following five courses.

Course #	Title	Hours
Both of these:		
MATH:3600	Introduction to Ordinary Differential Equations	3

BMB:4240	Biophysics and Advanced Biochemistry	3
Three electives from these:		
BMB:3120	Biochemistry and Molecular Biology I	3
BMB:3130	Biochemistry and Molecular Biology II	3
BMB:4310	Computational Biochemistry	3
May include one of these:		
CHEM:4430	Principles of Physical Chemistry	3
CHEM:4431	Chemical Thermodynamics	3
CHEM:4432	Quantum Mechanics and Chemical Kinetics	3
Up to 3 s.h. from this course:		
BMB:4999	Advanced Undergraduate Biochemistry Research (requires departmental approval in advance)	arr.

Biomathematics Subtrack

Biomathematics: Core Courses

Students in the biomathematics subtrack should complete one of the two sets of core courses below for a total of at least 23 s.h.

Course #	Title	Hours
Option 1		
One of these sequences:		
MATH:1850 & MATH:1860	Calculus I and Calculus II	8
MATH:1550 & MATH:1560	Engineering Calculus I and Engineering Calculus II	8
All of these:		
MATH:2700	Introduction to Linear Algebra	4
MATH:2850	Calculus III	4
MATH:3600	Introduction to Ordinary Differential Equations	3
MATH:3770	Foundations of Analysis	4

Course #	Title	Hours
Option 2		
All of these:		
MATH:1550	Engineering Calculus I	4
MATH:1560	Engineering Calculus II	4
MATH:2550	Engineering Matrix Algebra	2
MATH:2560	Engineering Differential Equations	3
MATH:3550	Engineering Vector Calculus	3
MATH:3770	Foundations of Analysis	4
An additional post-calculus mathematics course (prefix MATH) as previously defined in this section of the catalog, excluding MATH:2550, MATH:2560, MATH:2700, MATH:2850, MATH:3550, MATH:3600, MATH:3770, MATH:3800, MATH:4060, and MATH:4750		3-4

Biomathematics: Additional Required Courses

The physical sciences specialization with a biomathematics subtrack requires the following eight courses.

Course #	Title	Hours
Required Courses		
All of these:		
MATH:3800	Introduction to Numerical Methods	3
MATH:4060	Discrete Mathematical Models	3
MATH:4750	Introduction to Mathematical Biology	3
STAT:3120	Probability and Statistics	4
Elective Courses		
Two electives from these, with at least one course numbered 3000 or above:		
BIOL:2512	Fundamental Genetics	4
BIOL:2673	Ecology	3
BIOL:3233	Introduction to Developmental Biology	3
BIOL:3253	Neurobiology I	4
BIOL:3254	Neurobiology II	4
BIOL:3314	Genomics	3
BIOL:3343	Animal Physiology	3
BIOL:3713	Molecular Genetics	4
BMB:3120	Biochemistry and Molecular Biology I	3
BMB:3130	Biochemistry and Molecular Biology II	3
BMB:4240	Biophysics and Advanced Biochemistry	3
BME:2500	Biomaterials and Biomechanics	4
CHEM:2210	Organic Chemistry I	3
At most one of these (if selected, courses in this area may not count as an additional elective):		
BIOL:3172	Evolution	4
BIOL:3373	Human Population Genetics and Variation	3
At most one of these (if selected, courses in this area may not count as an additional elective):		
BIOL:2753	Introduction to Neurobiology	3
PSY:2701	Introduction to Behavioral Neuroscience	4
At most one of these (if selected, courses in this area may not count as an additional elective):		
BIOL:4213	Bioinformatics	4
BIOL:4386	Introduction to Scientific Computing for Biologists	3
BMB:3310	Practical Data Science and Bioinformatics	3
BMB:4310	Computational Biochemistry	3
Additional Elective		
One of these:		
A previously listed elective option numbered 3000 or above, if not used to satisfy the preceding requirement.		3-4
Computer science course (prefix CS) taken for at least 3 s.h. and numbered 2000 or above		3-4

Course #	Title	Hours
Mathematics course (prefix MATH) numbered MATH:3000-MATH:5899, excluding MATH:3550, MATH:3600, MATH:3700, MATH:3770, MATH:3800, MATH:3996, MATH:3997, MATH:4010, MATH:4020, MATH:4060, and MATH:4750		3-4

Chemistry Subtrack

The physical sciences specialization with a chemistry subtrack requires the following five courses.

Course #	Title	Hours
Both of these:		
MATH:3600	Introduction to Ordinary Differential Equations	3
CHEM:3250	Inorganic Chemistry	3
Three of these:		
CHEM:3110	Equilibria and Electrochemistry	3
CHEM:3120	Spectroscopy and Separations	3
CHEM:4430	Principles of Physical Chemistry	3
CHEM:4431	Chemical Thermodynamics	3
CHEM:4432	Quantum Mechanics and Chemical Kinetics	3
CHEM:4480	Introduction to Molecular Modeling	3
CHEM:5114	Chemical Systems Modeling	3
At most one of these:		
CHEM:3430	Analytical Measurements	3
CHEM:3440	Physical Measurements	3
CHEM:4450	Synthesis and Measurement	3

Physics Subtrack

The physical sciences specialization with a physics subtrack requires the following four courses. If students complete both MATH:3720 and MATH:3770, one may count toward core courses and the other toward this subtrack.

Course #	Title	Hours
Two of these:		
PHYS:3710	Intermediate Mechanics	3
PHYS:3730	Statistical Physics	3
PHYS:3741	Introduction to Quantum Mechanics I	3
PHYS:3742	Introduction to Quantum Mechanics II	3
PHYS:3811	Electricity and Magnetism I	3
PHYS:3812	Electricity and Magnetism II	3
One of these:		
MATH:3600	Introduction to Ordinary Differential Equations	3
MATH:3800	Introduction to Numerical Methods	3
MATH:4200	Complex Variables	3
One of these, which will not count toward the mathematics electives:		
MATH:3720	Introduction to Abstract Algebra	4
or MATH:3770	Foundations of Analysis	

Course #	Title	Hours
MATH:3900	Introduction to Mathematics Research	3
Mathematics course (prefix MATH) numbered MATH:4000-MATH:5899, excluding MATH:4010, MATH:4020, and MATH:4120		3-4
Physics course (prefix PHYS) taken for at least 3 s.h. and numbered PHYS:3000-PHYS:4998, excluding PHYS:3756, PHYS:3850, PHYS:4750, and PHYS:4990		

Program C: Core Courses

Students complete the following core mathematics courses.

Course #	Title	Hours
One of these sequences:		
MATH:1850 & MATH:1860	Calculus I and Calculus II	8
MATH:1550 & MATH:1560	Engineering Calculus I and Engineering Calculus II	8
One of these groups:		
MATH:2700 & MATH:2850	Introduction to Linear Algebra and Calculus III	8
MATH:2550 & MATH:2560 & MATH:3550	Engineering Matrix Algebra and Engineering Differential Equations and Engineering Vector Calculus	8
One of these:		
MATH:3720	Introduction to Abstract Algebra	4
MATH:3770	Foundations of Analysis	4

If students complete both MATH:3720 and MATH:3770, one may count toward core courses and the other toward the elective requirement described below.

More advanced courses may be substituted for the core courses with Department of Mathematics approval.

Program C: Electives

Students choose at least eight electives beyond the core courses, including four mathematics elective courses (12-16 s.h.), at least two of which must be upper-level math courses numbered MATH:3900 or numbered 4000 or above. Mathematics elective options include mathematics courses (prefix MATH) numbered MATH:3600–MATH:5810, excluding MATH:3700, MATH:3996, MATH:3997, MATH:4010, MATH:4020, and MATH:4120. Only one of MATH:2560 or MATH:3600 may be counted toward the major requirements.

All electives must be offered for 3–4 s.h. The individualized area of specialization should be in a subject that is math-related and should demonstrate a progression of learning in that discipline. At least some of the proposed electives must be upper-level for that course subject. Students must propose their plan of study before they begin their final year. Individualized plans of study must be approved by the Department of Mathematics.

Honors

Honors in the Major

Students majoring in mathematics have the opportunity to graduate with honors in the major. Students must maintain a cumulative University of Iowa grade-point average (GPA)

of at least 3.33, as required by the College of Liberal Arts and Sciences; additionally, students must maintain a cumulative GPA of at least 3.40 in the major, a GPA set by the Department of Mathematics.

To graduate with honors in the major, students also must complete one of the following options.

Option 1

Students complete five upper-level mathematics courses as defined in "Upper-Level Mathematics Courses" under "Requirements." Mathematics courses (prefix MATH) numbered 6000 or above must be approved by the mathematics honor advisor in advance.

Sometimes an honors research project may only produce a research report but not a formal thesis. A research report will be counted as one upper-level math course towards option 1 by enrolling in MATH:3996 Individual Study and Honors in Mathematics for 3 s.h. A research report must be approved by the honors research project supervisor.

Option 2

Students complete three upper-level mathematics courses and write an honors thesis. A student who chooses this option must contact the Department of Mathematics honors advisor and find a faculty member who is willing to supervise their honors thesis project. The Department of Mathematics honors advisor will then appoint a thesis committee of at least two faculty members. The student will need to obtain preapproval at the beginning of their thesis project, midterm approval from the thesis committee, and pass a defense.

The Department of Mathematics encourages students to use their sole-authored or coauthored research papers as honors theses if the papers have been published, accepted, or submitted to a research journal. Satisfactory peer reviews or referee's reports may be accepted in lieu of preapproval and midterm approval.

University of Iowa Honors Program

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university's honors program. Honors in mathematics is awarded by the Department of Mathematics and is separate from the University of Iowa Honors Program.

Membership in the UI Honors Program is not required to earn honors in the mathematics major. However, honors in mathematics can be applied toward UI Honors Program requirements.

Career Advancement

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Four-Year Graduation Plan

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the University's Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

Many mathematics courses must be taken in sequence, so students must begin major requirements as early as possible, and individual plans of study must be constructed carefully. The major typically requires 13 or 14 courses. Students must choose Program A, B, or C by the end of the third semester and must remain in their chosen program until they graduate in order to stay on track for the four-year graduation plan.

Before the third semester begins: coursework in the major through second-semester calculus.

Before the fifth semester begins: three or four more courses in the major.

Before the seventh semester begins: three or four more courses in the major and at least 90 s.h. earned toward the degree.

Before the eighth semester begins: two or three more courses in the major.

During the eighth semester: enrollment in all remaining coursework in the major, all remaining GE CLAS Core courses, and a sufficient number of semester hours to graduate.

Sample Plans of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

Mathematics, BS

- Program A [p. 7]
- Program B [p. 8]

Program A

Course	Title	Hours
Academic Career		
Any Semester		
Program A is primarily for students who plan to work in business or government or to pursue graduate study in mathematics.		
Students must earn at least 15 s.h. in post-calculus mathematics courses offered by the Department of Mathematics or cross-referenced with a mathematics course at the University of Iowa. Post-calculus courses are numbered 2000 or above, excluding: MATH:3700 Introduction to Matrix Theory, MATH:3996 Individual Study & Honors in Mathematics, MATH:3997 Readings in Mathematics, MATH:4010 Basic Analysis, and MATH:4020 Basic Abstract Algebra. [a]		
GE CLAS Core: Sustainability [b]		
	Hours	**0**
First Year		
Fall		
MATH:1850	Calculus I [c]	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric: Writing and Communication	3 - 4
GE CLAS Core: Values and Society [d]		3
CSI:1600	Success at Iowa	1
Elective course [e]		2
	Hours	**13-14**

Spring

MATH:1860	Calculus II	4
MATH:2700	Introduction to Linear Algebra	4
ENGL:1200 or RHET:1030	The Interpretation of Literature or Rhetoric: Writing and Communication	3 - 4
GE CLAS Core: Understanding Cultural Perspectives [d]		3
Elective course [e]		1
Hours		**15-16**

Second Year

Fall

MATH:2850	Calculus III	4
MATH:3600	Introduction to Ordinary Differential Equations	3
GE CLAS Core: Social Sciences [d]		3
GE CLAS Core: World Languages First Level Proficiency or elective course [f]		4 - 5
Elective course [e]		2
Hours		**16-17**

Spring

MATH:3720	Introduction to Abstract Algebra	4
Major: required post-calculus math elective course [g]		3
GE CLAS Core: Historical Perspectives [d]		3
GE CLAS Core: World Languages Second Level Proficiency or elective course [f]		4 - 5
Elective course [e]		2
Hours		**16-17**

Third Year

Fall

MATH:3770	Foundations of Analysis	4
Major: required post-calculus math elective course [g]		3 - 4
GE CLAS Core: Natural Sciences with Lab [d]		4
GE CLAS Core: World Languages Third Level Proficiency or elective course [f]		4 - 5
Hours		**15-17**

Spring

Major: required post-calculus math elective course [g]		3 - 4
Major: required upper-level math elective course [h]		3
GE CLAS Core: Natural Sciences without Lab [d]		3
GE CLAS Core: World Languages Fourth Level Proficiency or elective course [f]		4 - 5
Elective course [e]		3
Hours		**16-18**

Fourth Year

Fall

Major: required upper-level math elective course [h]		3
GE CLAS Core: International and Global Issues [d]		3
GE CLAS Core: Literary, Visual, and Performing Arts [d]		3
Elective course [e]		3
Elective course [e]		3
Hours		**15**

Spring

Major: required upper-level math elective course [h]		3
Elective course [e]		3
Elective course [e]		3
Elective course [e]		3
Elective course [e]		3
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) [i]		
Hours		**15**
Total Hours		**121-129**

a See General Catalog or consult an advisor for more information.

b Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative or Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Society.

c Enrollment in math courses requires completion of a placement exam.

d GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.

e Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.

f Students who have completed four levels of a single language or two levels of two different languages in high school or college have satisfied the GE CLAS Core World Languages requirement. Students who have completed three levels of a single language may complete a fourth-level course in the same language or may choose an approved World Language and Cultural Exploration course. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course. Contact your academic advisor or CLAS Undergraduate Programs Office with questions concerning the World Languages requirement.

g At least four of the six major electives must have a prefix of MATH, including at least three upper-level math courses. See General Catalog or consult an advisor for more information about appropriate elective courses.

h Mathematical electives must include at least three upper-level math courses. These include: MATH:3900 and math courses (MATH prefix) numbered 4000 and higher, but not MATH:4010, MATH:4020 and MATH:4120. Each upper-level math course is offered at most once per year; choose when to complete the upper-level requirement according to spring or fall offerings for desired courses.

i Please see Academic Calendar, on Office of the Registrar website, for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor or Degree Services.

Program B

Course	Title	Hours
Academic Career		
Any Semester		
Program B is intended for students seeking secondary school teaching licensure.		
Completion of mathematics (program B) BS, Teacher Education Program, and all general education requirements exceeds the minimum 120 s.h. required for graduation. Students should expect to take higher than average number of semester hours per term, take summer classes, and/or extend graduation time frame beyond four years.		

		Hours
Admission to the Teacher Education Program, College of Education, is by competitive application. For information about application requirements, process, and deadlines, please consult an advisor for the College of Education.		
GE CLAS Core: Sustainability [a]		
	Hours	**0**

First Year

Fall

MATH:1850	Calculus I [b, c]	4
RHET:1030 or ENGL:1200	Rhetoric: Writing and Communication or The Interpretation of Literature	3 - 4
GE CLAS Core: World Languages First Level Proficiency or elective course [d]		4 - 5
CSI:1600	Success at Iowa	1
	Hours	**12-14**

Spring

MATH:1860	Calculus II [b]	4
RHET:1030 or ENGL:1200	Rhetoric: Writing and Communication or The Interpretation of Literature	3 - 4
GE CLAS Core: World Languages Second Level Proficiency or elective course [d]		4 - 5
Course(s) required for second degree - consult sample plan for BA in mathematics education		3
10-hour pre-admission school field experience [b, e]		
	Hours	**14-16**

Summer

GE CLAS Core: International and Global Issues [f]		3
GE CLAS Core: Natural Sciences without Lab [f]		3
Prepare materials for Teacher Education Program application (e.g. essays, letters of recommendation) [g]		
	Hours	**6**

Second Year

Fall

MATH:2700	Introduction to Linear Algebra	4
MATH:2850	Calculus III	4
GE CLAS Core: World Languages Third Level Proficiency or elective course [d]		4 - 5
Course(s) required for second degree - consult sample plan for BA in mathematics education		3
Admission Application: apply to the Teacher Education Program [g]		
	Hours	**15-16**

Spring

MATH:2150	Foundations of Geometry [h]	3
GE CLAS Core: Social Sciences [f]		3
GE CLAS Core: World Languages Fourth Level Proficiency or elective course [d]		4 - 5
Course(s) required for second degree - consult sample plan for BA in mathematics education		6
	Hours	**16-17**

Summer

GE CLAS Core: Natural Sciences with Lab [f]		4
	Hours	**4**

Third Year

Fall

MATH:3720	Introduction to Abstract Algebra	4
MATH:4050	Introduction to Discrete Mathematics [i]	3
GE CLAS Core: Historical Perspectives [f]		3
Course(s) required for second degree, including a course that satisfies the GE CLAS Core Understanding Cultural Perspectives area - consult sample plan for BA in mathematics education		6
	Hours	**16**

Spring

MATH:3770	Foundations of Analysis	4
STAT:3120	Probability and Statistics	4
Major: required post-calculus math elective course [j]		3 - 4
Course(s) required for second degree, including a course that satisfies the GE CLAS Core Values and Society area - consult sample plan for BA in mathematics education		6
Apply for student teaching (see the College of Education website for application instructions and deadlines)		
	Hours	**17-18**

Fourth Year

Fall

CS:1210	Computer Science I: Fundamentals	4
Major: required upper-level math elective course [k]		3 - 4
Major: required upper-level math elective course [k]		3 - 4
GE CLAS Core: Literary, Visual, and Performing Arts [f]		3
Course(s) required for second degree - consult sample plan for BA in mathematics education		7
	Hours	**20-22**

Spring

Course(s) required for second degree - consult sample plan for BA in mathematics education		15
Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall) [l]		
	Hours	**15**
	Total Hours	**135-144**

a Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative or Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Society.

b Required for admission into the Teacher Education Program.

c Enrollment in math courses requires completion of a placement exam.

d Students who have completed four levels of a single language or two levels of two different languages in high school or college have satisfied the GE CLAS Core World Languages requirement. Students who have completed three levels of a single language may complete a fourth-level course in the same language or may choose an approved World Language and Cultural Exploration course. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course. Contact your academic advisor or CLAS Undergraduate Programs Office with questions concerning the World Languages requirement.

e Complete the College of Education 10-hour pre-admission
   school field experience verification form available on the
   Teacher Education Program web page.

f GE CLAS Core courses may be completed in any order
   unless used as a prerequisite for another course. Students
   should consult with an advisor about the best sequencing of
   courses.

g Please see the College of Education website for detailed
   application instructions and deadlines. Admission is
   selective and a priority deadline exists.

h Typically this course is offered in spring semesters only.
   Check MyUI for course availability since offerings are subject
   to change.

i Students must complete MATH:4050, a fall-only course, or
   MATH:4060, a spring-only course.

j Post-calculus courses are numbered 2000 or above,
   excluding: MATH:3700, MATH:3996, MATH:3997,
   MATH:4010, MATH:4020, and MATH:4120.

k Upper-level electives include MATH:3900 or any MATH prefix
   courses numbered 4000 or above, excluding MATH:4010,
   MATH:4020, and MATH:4120.

l Please see Academic Calendar, on Office of the Registrar
   website, for current degree application deadlines. Students
   should apply for a degree for the session in which all
   requirements will be met. For any questions on appropriate
   timing, contact your academic advisor or Degree Services.