# MATHEMATICS (MAT) 452

313 Stevenson Hall, (309) 438-8781 https://Math.IllinoisState.edu Chairperson: George Seelinger https://Math.IllinoisState.edu

### **Cooperative Education/Internship in Mathematics**

The Department offers a Cooperative Education/Internship program for undergraduate Mathematics majors which provides for practical work experience in business, government, or industry. Students interested in participating in the program may secure further information by contacting the Mathematics Department Office.

### **Honors in Mathematics**

The Department offers an honors program for majors emphasizing a broad liberal arts program with requirements in Mathematics and in the General Education Program. Students interested in participating in departmental honors programs may secure further information by contacting the Undergraduate Director. In addition students must fulfill the general requirements for participation in the University Honors Program. Completion of the program will be posted on a student's transcript and diploma. The Department also offers in-course honors for students enrolled in the University Honors Program. Further details about the University Honors program are available at

https://Honors.IllinoisState.edu.

### Minor in Cognitive Science

The Department of Mathematics participates in the Minor in Cognitive Science program. Several courses offered by the Department contribute to the minor. For further information, please consult a Department advisor as well as the section entitled "Interdisciplinary Studies Programs" in this Undergraduate Catalog.

### **Mathematics Programs**

Degrees Offered: B.A., B.S.

### **Career Information for Mathematics Majors and Minors:**

Career information for Mathematics Majors and Minor can be found on the website at Math.IllinoisState.edu/careers. Students are urged to consult with the Mathematics Undergraduate Director or Mathematics faculty in planning their programs. Information on careers in Mathematics can be secured from the Mathematics Department advisor and from the Mathematics Department website.

Students interested in meeting the requirements for licensure to teach secondary school Mathematics must consult with a Mathematics Education advisor to design a special program of studies.

Students preparing for a specific career are advised to include courses from the appropriate list(s) that follow. The courses with an asterisk (\*) should be among those selected. Those wishing a major or minor in Mathematics should select additional courses from the list as well. (Note that some courses in the following lists may not count toward major or minor requirements.):

- Business Management: MAT 260, 337, 340, 350, 351\*, 353, 356, 361, 362\*, 363, 378
- Secondary Teaching: MAT 210, 211\*, 223\*, 236\*, 247, 260\*, 268, 320, 321, 323\*, 324\*, 326\*, 330\*, 336, 347, 350, 351, 362, 378
- Business, Government, and Industry: MAT 260, 337, 340\*, 341, 345, 351\*, 353, 356\*, 361, 362, 363, 378
- Applications or Research in Physical Sciences: MAT 236, 336, 337, 340\*, 341\*, 345\*, 350, 378
- Applications or Research in Social Sciences: MAT 260, 337, 340, 350\*, 351\*, 356\*, 361, 362, 363, 378
- Graduate Study and Research in Mathematics: MAT 210, 236\*, 247, 260, 330, 336\*, 337\*, 340, 341, 345, 347\*, 350, 351, 361, 363, 378

**Program Admission Requirements for New and Continuing Students:** Admission to this academic program is limited and is based on space availability and the competitiveness of the applicant pool. Factors that may be considered include, but are not limited to: courses completed, cumulative GPA, hours completed, personal interview or written statement, and samples of work completed. For additional information on minimum requirements for admission and the application and selection process, visit IllinoisState.edu/Majors or contact the undergraduate advisor for the intended major. Departmental requirements for admission to the University Professional Studies program include a minimum Mathematics GPA of 2.80, a cumulative GPA of 2.80 and completion of Calculus I, II, and III and MAT 223 with grades of C or better.

The term "Mathematics GPA" used above and throughout this Undergraduate Catalog means a GPA computed using all college Mathematics courses completed at Illinois State University that are eligible for credit toward the major as well as other required courses for the major.

The only Mathematics courses that are not eligible for credit toward the major are the following: MAT 102, 104, 108, 113, 119, 120, 121, 130, 131, 150, 152, 160, 162, 201, 202, 298, 298A50, 302, 304, 307, 309, 312, 314, 315, 385. In addition, MAT 280 and 283 are not eligible for credit toward MAT/MAT Education Sequences.

**Graduation GPA Requirement for Majors:** The minimum graduation Mathematics GPA is 2.00 for a Mathematics Major, 2.80 for a Mathematics Teacher Education Major, 3.00 for Mathematics Major: Actuarial Science Sequence, and 2.00 for Mathematics Major: Statistics Sequence. These grade point averages are computed using the following courses taken at Illinois State: the required English and computer programming courses and all Mathematics courses that are eligible for credit toward the major.

NOTE: Students who have taken calculus in high school may request to take a Calculus Proficiency Test. If proficiency credit is granted, students may begin their Mathematics courses with MAT 146 or a higher-level course.

To ensure proper placement, transfer students should consult with an advisor prior to registration for classes.

### **Major in Mathematics**

Submission of senior portfolio is required (see advisor)

### Suggested Mathematics Schedules for Majors:

- Schedule (a) Students beginning with Calculus I
- Schedule (b) Students beginning with Calculus II

Schedule (c) Accelerated schedule for honors students or those preparing for graduate school

Semester	(a)	(b)	(c)
1	145	146	146
2	146	147	147
3	147	175	175,260
4	175, 260	260	236
5	236, 247	236, 247	247

### **Mathematics Teacher Education Sequence**

This sequence of the major is part of the entitlement program leading to high school mathematics teacher endorsement.

### Notes:

MAT 211; TCH 216 or equivalent, and MAT 236 (or concurrent registration) are prerequisites for MAT 323. MAT 323 must be completed before the student teaching experience.

MAT 147 and 45 credit hours completed are prerequisites for MAT 223.

MAT 326 can count as a mathematics elective if not used for the technology requirement.

- Interested students should consult their advisor about opportunities for tutoring secondary school students, serving as a teaching assistant, or other relevant voluntary Clinical Experiences.
- Submission of senior portfolio required
- A grade of C or better in all required major courses, and adherence to all requirements and deadlines is required for admission to Professional Studies and Student Teaching. Application forms and information about deadlines and procedures for admission to Professional Studies and Student Teaching are available from the Cecilia J. Lauby Teacher Education Center and on the Mathematics Department website.

Admission to the Mathematics Teacher Education Sequence is limited and highly competitive.

Suggested Mathematics Schedules for Mathematics Teacher Education Sequence Majors:

Schedule (a) Students beginning with Calculus I Schedule (b) Students beginning with Calculus II Schedule (c) Accelerated schedule for honors students (Students beginning with Calculus III).

Semester	(a)	(b)	(c)
1	145	146	147, 175
2	146	147, 175	260, 320
3	147, 175	260, 320	211
4	233, 260, 320	211	223, 352
5	211, 352	223, 352	236 or elective
6	236, elective	236, elective	236 or elective
7	323, 326, 328	323, 326, 328	323, 326, 328
8	324	324	324

### Pedagogy Emphasis Sequence

This sequence of the major is not part of the entitlement program leading to high school mathematics teacher endorsement. All requirements are the same as the Mathematics Teacher Education Sequence except for State of Illinois requirement of successful completion of the edTPA.

### **Actuarial Science Sequence**

This sequence of the major is designed to teach the students the mathematical foundations of actuarial science, and to prepare them for careers as actuaries in a variety of fields dealing with the risk of potential financial losses, such as life insurance, health insurance, financial risk management, property/casualty/liability insurance, pensions, or employee benefits.

- Submission of senior portfolio and approval of it by the advisor (see actuarial advisor)
- Students are encouraged to take MAT 283 (actuarial computing), and intensive reviews for actuarial examinations offered through the Illinois State University Conferencing Unit, as well as participate in the Predictive Analytics Competition held annually at Illinois State University.

### Suggested Mathematics Schedules for Actuarial Science Majors: Semester Courses

1	145
2	146
3	147, 175
4	280, 350
5	351, 380
6	353 <i>,</i> 383
7	381 or 355
8	384

Required courses in the Actuarial Science Sequence (outlined above) provide the contents of the Society of Actuaries examinations P, FM, IFM, STAM, and LTAM, or the Casualty Actuarial Society examinations 1, 2, 3F, MAS I and MAS II, as well as complete Validation by Educational Experience (VEE) requirements. Courses correspond to professional actuarial examinations as follows:

SOA exam P (same as CAS exam 1): MAT 350 SOA exam FM (same as CAS exam 2): MAT 280 SOA exam IFM and CAS exam 3F: MAT 383 and FIL 242 SOA exam LTAM: MAT 380 and MAT 381 SOA exam STAM: MAT 381 and 384

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SOA exam SRM: MAT 353 and MAT 355

- SOA exam PA: MAT 353, MAT 355, and Statistical Project Competition
- CAS exam MAS I: MAT 351, MAT 353, MAT 355, MAT 380, and MAT 381
- CAS exam MAS II: MAT 355, MAT 381, MAT 384

VEE Mathematical Statistics: MAT 351

VEE Economics: ECO 101 and 102

VEE Accounting and Finance: ACC 131, FIL 242 and FIL 341

### **Statistics Sequence**

This sequence of the major is designed to prepare students for statistical work in industry and government. In addition to learning the mathematical foundation in statistics, students study at least two cognate areas of application of statistics from Biometrics, Econometrics, and Psychometrics. This will allow students to experience many fields of statistical applications and select a field of their choice for a career.

It is to the advantage of the student to have a minor or double major in one of the above areas. However, it is not a requirement for the sequence. Senior students in good standing are encouraged to take upper level applied statistics courses from selected cognate areas.

# Suggested Mathematics Schedules for the Statistics Sequence Majors:

Schedule (a) Students beginning with Calculus I

Schedule (b) Students beginning with Calculus II

Schedule (c) Students intending to pursue graduate studies

Semester	(a)	(b)	(c)
1	145	146	146
2	146	147	147
3	147, 260	260	175, 260
4	175, 350	175, 350	350
5	351	351	351, ST*
6	356, ST*	356, ST*	351, ST*
7	353, ST*	353, ST*	353, ST*
8	ST*, ST*	ST*, ST*	458*

\*In the above schedule ST stands for selected courses from cognate areas. Senior students with good standing are encouraged to take upper level statistics courses. However, in order to take a graduate level course, permission is required from the respective departments and the graduate school.

### **Minor in Mathematics**

- 22-24 hours in Mathematics required
- Required courses (8 hours):
  - MAT 145 and 146
- At least four courses (14-16 hours) chosen from: MAT 147, 175, 236, 247, 260, 268, 330, 336, 337, 340, 341, 345, 347, 350, 351, 361, 362, 363, 378

### **Clinical Experiences in Teacher Education**

A variety of clinical (pre-student teaching) experiences, as well as student teaching, are included in the teacher candidates professional preparation. Observations, small and large group instruction, tutoring, field experiences, and student teaching are included in the Clinical Experiences Program. The experiences offered prior to student teaching are integral parts of specific college courses. Clinical experiences are provided in off-campus professional development schools, local schools and campus laboratory schools, agencies and other approved non-school settings. The Cecilia J. Lauby Teacher Education Center monitors and documents all clinical experiences. Teacher candidates will show verification of having completed clinical experience commensurate with attaining local, state, and national standards. Teacher candidates must provide their own transportation to clinical experiences sites.

Candidates are required to provide documentation of meeting all State of Illinois, district, and university requirements in regard to criminal background checks BEFORE beginning any clinical experiences. Criminal background checks must remain current as of the last day of the clinical experience. Candidates should consult with clinical course faculty and the Cecilia J. Lauby Teacher Education Center well in advance of clinical experience to determine specific requirements needed each semester.

The approximate number of clinical hours associated with each course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend relates to the kind of activity related to a specific course.

### **Clinical Experiences Legend**

- Observation (including field trips)
- Tutoring one-on-one contact
- Non-instructional assisting
- Small group instruction
- Whole class instruction
- Work with clinic client(s)
- Graduate practicum
- Professional meeting

### **Mathematics Courses**

- A year of high school geometry and a second year of high school algebra are highly recommended for anyone who wants to take Mathematics courses.
- Students may not enroll in a course which is prerequisite to a course that has been completed with a grade of C or better.
- Some courses may not be taken under the Passing/No Passing (P/NP) option (see course descriptions).

### **Mathematics Courses:**

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

### MAJOR IN MATHEMATICS (B.A., B.S.)

### **General Education (39 credit hours)**

Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

### Communication and Composition (2 courses required)

3 COM 110 Communication as Critical Inquiry

3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

### Mathematics (1 course required)

\_\_\_\_\_ 4 MAT 145 Calculus I

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### Natural Science/Natural Science Alternatives (2 courses required)

Students must complete 1 course from 2 different sciences.

United States Traditions (1 course required)

Individuals & Civic Life (1 course required)

Fine Arts (1 course/3 credit hours required)\*\*\*

Humanities (1 course required)\*\*\*

Language in the Humanities (1 course required)\*\*\*

Quantitative Reasoning (1 course required) \_\_\_\_\_ 4 MAT 146 Calculus II

### Science, Math, & Technology (1 course required) Exempt for Mathematics majors

Social Sciences (1 course required)\*\*\*

### **Additional Graduation Requirements**

\_\_\_/120 minimum total credit hours

\_\_\_\_/42 minimum senior college hours

College of Arts & Sciences language requirement

### AMALI requirement

\*\*\*certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_\_ 4 MAT 147 Calculus III

### Major (52 credit hours)

мла і	ron	uirements (min 45 credit hours)
	<u>104</u>	MAT 145 Calculus I /P: C or bottor in MAT 144 or placement)
	- 4	MAT 145 Calculus I (P. C or better in MAT 144 of placement)
	- 4	MAT 146 Calculus II (P: C or better in MAT 145)
	_ 4	MAT 147 Calculus III (P: C or better in MAT 146)
	_ 4	MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)
	4	MAT 236 Elementary Abstract Algebra (P: C or better in MAT 17 and 260 or conc. reg.)
	3	MAT 247 Elementary Real Analysis (P: C or better in MAT 175 and 260)
	4	MAT 260 Discrete Mathematics (P: C or better in MAT 146)
	4	MAT 350 Applied Probability Models (P: C or better in MAT 147
Take	one	of the following courses:
	3	MAT 336 Advanced Abstract Algebra (P: C or better in MAT 236
	4	MAT 337 Advanced Linear Algebra (P: C or better in MAT 175; senior standing)
	4	MAT 347 Advanced Real Analysis (P: C or better in MAT 247
	4	OF 345) MAT 240 Introduction to Complex Applysis (D: MAT 147)
<b>Take</b> All ele acade	10-1 ective mic	<b>1 credit hours of additional Mathematics electives:</b> es cannot be from same elective group. Please consult your advisor. WAT 330, 336, 337; Analysis: MAT 340, 341, 345, 347, 349;
Discre	Jia.i ato∙N	MAT 361, 360, 357, Analysis, MAT 340, 341, 345, 347, 345, MAT 361, 362, 363, Statistics, MAT 351, Research, MAT 368)
Requ	iren	nents outside of MAT
Requ Take	iren one	n <u>ents outside of MAT</u> of the following courses:
<u>Requ</u> Take	iren one	nents outside of MAT of the following courses: ENG 145 Writing in the Academic Disciplines (P: ENG 101)

### Take one of the following courses:

- \_\_\_\_\_ 4 IT 165 Computer Programming for Scientists (P: C or better in MAT 145)
- 4 IT 168 Structured Problem-Solving Using the Computer (P: MAT 104)

### Notes:

- Hours taken in Information Technology do not count toward the required 45 hours in Mathematics
- Submission of senior portfolio is required (see advisor)
- The following required courses must be completed with a grade of C or better:
  - MAT 145, 146, 147, 175, 236, 247, 260, 350
  - ENG 145 or 249 or equivalent

### Mathematics Courses:

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

### MAJOR IN MATHEMATICS (B.A., B.S.) Transfer Students

# Illinois Articulation Initiative (min. 37 credit hours)

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

Communication and	Composition	(3 courses	required)
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- A grade of C or better required in ENG 101 and 145 or equivalents
- \_\_\_\_\_ 3 C2 900 COM 110 Communication as Critical Inquiry
- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

### Mathematics (1 course required)

Please see major requirements for mathematics options

4 M1 900-1 MAT 145 Calculus I

### Physical & Life Sciences (2 courses/7-8 hours required)

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

### Humanities & Fine Arts (3 courses required)

At least one humanities and 1 fine arts course required

### Social & Behavioral Sciences (3 courses required)

Two different disciplines must be represented

### **Additional Graduation Requirements**

\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

### \_\_\_\_ College of Arts & Sciences language requirement

### AMALI requirement

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\*\*\*certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_\_ 4 MAT 147 Calculus III

### Major (52 credit hours)

# MAT requirements (min. 45 credit hours) 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement) 4 MAT 146 Calculus II (P: C or better in MAT 145) 4 MAT 147 Calculus III (P: C or better in MAT 146) 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146) 4 MAT 236 Elementary Abstract Algebra (P: C or better in MAT 175 and 260 or conc. reg.) 3 MAT 247 Elementary Real Analysis (P: C or better in MAT 175 and 260) 4 MAT 260 Discrete Mathematics (P: C or better in MAT 146) 4 MAT 350 Applied Probability Models (P: C or better in MAT 147)

### Take one of the following courses:

- \_\_\_\_\_ 3 MAT 336 Advanced Abstract Algebra (P: C or better in MAT 236)
- 4 MAT 337 Advanced Linear Algebra (P: C or better in MAT 175; senior standing)
- \_\_\_\_\_ 4 MAT 347 Advanced Real Analysis (P: C or better in MAT 247 or 345)
- 4 MAT 349 Introduction to Complex Analysis (P: MAT 147)

### Take 10-11 credit hours of additional Mathematics electives:

All electives cannot be from same elective group. Please consult your academic advisor.

(Algebra: MAT 330, 336, 337; Analysis: MAT 340, 341, 345, 347, 349; Discrete: MAT 361, 362, 363; Statistics: MAT 351; Research: MAT 268)

### **Requirements outside of MAT**

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### Take one of the following courses:

- 3 ENG 145 Writing in the Academic Disciplines (P: ENG 101)
- 3 ENG 249 Technical & Professional Writing I (P: ENG 101)

### Take one of the following courses:

- \_\_\_\_\_ 4 IT 165 Computer Programming for Scientists (P: C or better in MAT 145)
- 4 IT 168 Structured Problem-Solving Using the Computer (P: MAT 104)

### Notes:

- Hours taken in Information Technology do not count toward the required 45 hours in Mathematics
- Submission of senior portfolio is required (see advisor)
- The following required courses must be completed with a grade of C or better:
  - MAT 145, 146, 147, 175, 236, 247, 260, 350
  - ENG 145 or 249 or equivalent

### Mathematics Courses:

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

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### MAJOR IN MATHEMATICS TEACHER EDUCATION SEQUENCE (B.A., B.S.)

# General Education (39 credit hours) Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses. Communication and Composition (2 courses required) \_ 3 COM 110 Communication as Critical Inquirv \_\_\_\_ 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry Mathematics (1 course required) 4 MAT 145 Calculus I Natural Science/Natural Science Alternatives (2 courses required) Students must complete 1 course from 2 different sciences. United States Traditions (1 course required) Individuals & Civic Life (1 course required) Fine Arts (1 course/3 credit hours required)\*\*\* Humanities (1 course required)\*\*\* Language in the Humanities (1 course required)\*\*\* Quantitative Reasoning (1 course required) \_\_\_\_ 4 MAT 146 Calculus II Science, Math, & Technology (1 course required) **Exempt for Mathematics majors** Social Sciences (1 course required)\*\*\* \_\_\_\_\_ 3 PSY 110 Fundamentals of Psychology **Additional Graduation Requirements** \_/120 minimum total credit hours \_/42 minimum senior college hours College of Arts & Sciences language requirement AMALI requirement \*\*\* certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses. B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_\_ 4 MAT 147 Calculus III

### Major (min. 50 credit hours in Math)

	4	MAT 145 Calculus I (P: C or better in MAT 144 or placement)
	4	MAT 146 Calculus II (P: C or better in MAT 145)
	4	MAT 147 Calculus III (P: C or better in MAT 146)
	4	MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)
	4	MAT 211 Euclidian & Non-Euclidian Geometry (P: C or better in
		MAT 147 and 175)
	3	MAT 223 Introduction to Secondary Mathematics Education (P: C
		or better in MAT 147 or conc. reg.; 45+ earned hours)
	4	MAT 236 Elementary Abstract Algebra (P: C or better in MAT 175
		and 260 or conc. reg.)
	4	MAT 260 Discrete Mathematics (P: C or better in MAT 146)
	4	MAT 320 History of Mathematics (P: C or better in MAT 147)
	3	MAT 323 Teaching Mathematics in the Secondary School‡ (P: C
		or better in MAT 211, 223 and 236 or conc. reg.; TCH 216;
		minimum 2.8 major and cumulative GPA; department approval)
	4	MAT 324 Seminars for Student Teachers of Mathematics (P: C or
		better in MAT 236 and 323; conc. reg. or completion STT 399A27)
	4	MAT 352 Probability & Statistical Inference for Educators (P: C or
		better in MAT 147)
ike o	ne	of the following courses:
	3	MAT 268 Introduction to Undergraduate research in
	-	Mathematics (P: B or better in MAT 146)
	3	MAI 328 Mathematics for Secondary Teacher: A Capstone
ake o	one	of the following courses:
	4	MAT 326 Mathematical Problem Solving Using Technology (P: C
	•	or better in MAT 211)
	4	IT 168 Structured Problem-Solving Using the Computer
		(P: MAT 104)
	3	TEC 151 Introduction to Computer Systems Technology
		Note: TEC credit hours do not count toward the minimum 50
		nours requirea in MAT)
ake o	one	additional senior college Mathematics Teacher Education
lectiv	ve: I	Elective cannot be designated for the actuarial sequence. Please
onsul	t yo	bur academic advisor.
rofes	sio	nal Education requirements (27 credit hours)
	3	PSY 215 Educational Psychology (P: PSY 110 or 111)
	3	SED 101 The Exceptional Learner
	2	TCH 212 The Teaching Profession in Secondary Schools (P: 45+
		earned hours; 2.5 major & cum. GPA; ENG 101, COM 110)
	3	TCH 216 Principles & Practices for Teaching & Learning in
		Secondary Schools (P: TCH 212; 2.5 major & cum. GPA)
	3	TCH 219 Integrating Multiple Literacies & Technology Across the
		Secondary Curriculum (P: TCH 212, 216; 2.5 major & cum. GPA)
	10	) STT 399A27 Student Teaching in Mathematics

### Take one of the following courses:

3 EAF 228 Social Foundations of Education

- \_\_\_\_\_ 3 EAF 231 Introduction to Philosophy of Education
- \_\_\_\_\_ 3 EAF 235 Historical Foundations

**‡** Admission to Professional Studies required

### Mathematics Courses:

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

## MAJOR IN MATHEMATICS TEACHER EDUCATION SEQUENCE (B.A., B.S.) Transfer Students

Illinois Articulation Initiative (min. 37 credit hours) To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

### Communication and Composition (3 courses required)

		•	•	•	•
A grade o	f C or be	tter require	ed in ENG 10	1 and 145 o	r equivalents
3	C2 900	COM 110	Communica	tion as Critic	al Inquiry

- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

### Mathematics (1 course required)

Please see major requirements for mathematics options 4 M1 900-1 MAT 145 Calculus I

### Physical & Life Sciences (2 courses/7-8 hours required)

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

### Humanities & Fine Arts (3 courses required)

At least 1 humanities and 1 fine arts course required

### Social & Behavioral Sciences (3 courses required)

Two different disciplines must be represented

\_\_\_\_\_ 3 S6 900 PSY 110 Fundamentals of Psychology

### **Additional Graduation Requirements**

/120 minimum total credit hours

\_/42 minimum senior college hours

\_\_\_ College of Arts & Sciences language requirement

### AMALI requirement

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\*\*\*certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_\_ 4 MAT 147 Calculus III

### Major (min. 50 credit hours in Math)

- 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
- 4 MAT 146 Calculus II (P: C or better in MAT 145)
- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)
- 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)
- 4 MAT 211 Euclidian & Non-Euclidian Geometry (P: C or better in MAT 147 and 175)
- \_\_\_\_\_ 3 MAT 223 Introduction to Secondary Mathematics Education (P: C or better in MAT 147 or conc. reg.; 45+ earned hours)
- \_\_\_\_\_ 4 MAT 236 Elementary Abstract Algebra (P: C or better in MAT 175 and 260 or conc. reg.)
- 4 MAT 260 Discrete Mathematics (P: C or better in MAT 146)
- 4 MAT 320 History of Mathematics (P: C or better in MAT 147)
- 3 MAT 323 Teaching Mathematics in the Secondary School<sup>‡</sup> (P: C or better in MAT 211, 223 and 236 or conc. reg.; TCH 216; minimum 2.8 major and cumulative GPA; department approval)
- MAT 324 Seminars for Student Teachers of Mathematics (P: C or
- better in MAT 236 and 323; conc. reg. or completion STT 399A27) 4 MAT 352 Probability & Statistical Inference for Educators (P: C or
- better in MAT 147)

### Take one of the following courses:

- \_\_\_\_\_ 3 MAT 268 Introduction to Undergraduate research in Mathematics (P: B or better in MAT 146)
- 3 MAT 328 Mathematics for Secondary Teacher: A Capstone Experience (P: MAT 223 and 211)

### Take one of the following courses:

- \_\_\_\_\_ 4 MAT 326 Mathematical Problem Solving Using Technology (P: C or better in MAT 211)
- \_\_\_\_\_ 4 IT 168 Structured Problem-Solving Using the Computer (P: MAT 104)
- 3 TEC 151 Introduction to Computer Systems Technology Note: TEC credit hours do not count toward the minimum 50 hours required in MAT)

### Take one additional senior college Mathematics Teacher Education

elective: Elective cannot be designated for the actuarial sequence. Please consult your academic advisor.

### Professional Education requirements (27 credit hours)

- \_\_\_\_\_ 3 PSY 215 Educational Psychology (P: PSY 110 or 111)
- \_\_\_\_\_ 3 SED 101 The Exceptional Learner
- 2 TCH 212 The Teaching Profession in Secondary Schools (P: 45+ earned hours; 2.5 major & cum. GPA; ENG 101, COM 110)
- 3 TCH 216 Principles & Practices for Teaching & Learning in Secondary Schools (P: TCH 212; 2.5 major & cum. GPA)
- 3 TCH 219 Integrating Multiple Literacies & Technology Across the Secondary Curriculum (P: TCH 212, 216; 2.5 major & cum. GPA)

### 10 STT 399A27 Student Teaching in Mathematics

### Take one of the following courses:

- 3 EAF 228 Social Foundations of Education
- \_\_\_\_\_ 3 EAF 231 Introduction to Philosophy of Education
- \_\_\_\_\_ 3 EAF 235 Historical Foundations

‡ Admission to Professional Studies required

### **Mathematics Courses:**

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

Maior (74 credit hours)

## **MAJOR IN MATHEMATICS ACTUARIAL SCIENCE SEQUENCE (B.A., B.S.)**

General Education (39 credit hours)	Major (74 credit hours)
Refer to the General Education section of the Undergraduate Catalog for a	
complete list of General Education requirements and courses.	4 MAT 146 <sup>+</sup> Calculus II (P: C or better in MAT 145)
Communication and Composition (2 courses required)	4 MAT 147 Calculus III (P: C or better in MAT 146)
3 COM 110 Communication as Critical Inquiry	4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)
3 ENG 101 or ENG 101A10 Composition as Critical Inquiry	4 MAT 280 <sup>+</sup> Financial Mathematics (P: B or better in MAT 145
Mathematics (1 course required)	& 146) 1 MAT 208 Professional Practice
4 MAT 145 Calculus I	
Natural Science/Natural Science Alternatives (2 courses required)	<ul> <li>4 MAT 350<sup>+</sup> Applied Probability Models (P: C or better in MAT 14<sup>-</sup></li> <li>4 MAT 351 Statistics &amp; Data Analysis (P: C or better in MAT 350)</li> </ul>
students must complete 1 course from 2 different sciences.	4 MAT 353 Regression & Time series Analysis (P: MAT 351)
	4 MAT 380 Actuarial Models I (P: B or better in MAT 280 and 350)
United States Traditions (1 course required)	4 MAT 381/MAT 355 Actuarial Models II (P: B or better in MAT 38 or Generalized Linear Models & Predictive Modeling (P: MAT 35 (MAT 353 Rec.)
Individuals & Civic Life (1 course required)	4 MAT 383 Actuarial Models III (P: B or better in MAT 280 and 350
	4 MAT 384 Actuarial Modeling (P: C or better in MAT 351)
Fine Arts (1 course/3 credit hours required)***	3 ACC 131 Financial Accounting (P: 12+ earned hours)
	3 ACC 132 Managerial Accounting (P: ACC 131)
Humanities (1 course required)***	3 ECO 101 Principles of Microeconomics
	3 ECO 102 Principles of Macroeconomics
Language in the Humanities (1 course required)***	<ul> <li>FIL 242 Investments (P: C or better in FIL 240)</li> <li>[FIL 240 P: MQM 100 (or ECO/POL/PSY 138); ACC 132; ECO 105</li> </ul>
	3 FIL 250 Introduction to Risk & Insurance
Quantitative Reasoning (1 course required)	2. Ell 241 Intermediate Duringer Finance (Dr. C. er better in Ell 240)
	FIL 218 or 241 or conc. reg.)
Science, Math, & Technology (1 course required)	
Exempt for Mathematics majors	Take one of the following courses:
Social Sciences (1 course required)***	<ul> <li>4 IT 166 Python Programming for Science and Data Analysis (P: C better in MAT 121 or 145 or GEO 238)</li> </ul>
Additional Graduation Requirements	<ul> <li>4 IT 168 Structured Problem-Solving Using the Computer (P: MAT 104 or high school equivalent)</li> </ul>
/120 minimum total credit hours	t A grade of P or bottor required
/42 minimum senior college hours	· A grade of B of better required
College of Arts & Sciences language requirement	Mathematics Courses:

### AMALI requirement

\*\*\* certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_ 4 MAT 147 Calculus III

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

# MAJOR IN MATHEMATICS ACTUARIAL SCIENCE SEQUENCE (B.A., B.S.) Transfer Students

### Illinois Articulation Initiative (min. 37 credit hours)

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

### Communication and Composition (3 courses required)

A grade of	f C or be	tter require	ed in ENG	101 and	145 or	equivalent	S
3	C2 900	COM 110	Commun	ication as	Critica	al Inquiry	

- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

### Mathematics (1 course required)

Please see major requirements for mathematics options 4 M1 900-1 MAT 145 Calculus I

### Physical & Life Sciences (2 courses/7-8 hours required)

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

### Humanities & Fine Arts (3 courses required)

At least 1 humanities and 1 fine arts course required

### Social & Behavioral Sciences (3 courses required)

Two different disciplines must be represented. ECO 101 and 102 at ISU have not been approved for IAI at this time.

\_\_\_\_\_ 3 S3 901 Macroeconomics

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\_\_\_\_\_ 3 S3 902 Microeconomics

### **Additional Graduation Requirements**

\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

College of Arts & Sciences language requirement

### AMALI requirement

\*\*\*certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_\_ 4 MAT 147 Calculus III

### Major (74 credit hours)

- \_\_\_\_\_ 4 MAT 145<sup>+</sup> Calculus I (P: C or better in MAT 144 or placement)
- \_\_\_\_\_ 4 MAT 146<sup>+</sup> Calculus II (P: C or better in MAT 145)
- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)
- 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)
- 4 MAT 280<sup>†</sup> Financial Mathematics (P: B or better in MAT 145 & 146)
- \_\_\_\_\_ 1 MAT 298 Professional Practice
- 4 MAT 350<sup>+</sup> Applied Probability Models (P: C or better in MAT 147)
- 4 MAT 351 Statistics & Data Analysis (P: C or better in MAT 350)
- 4 MAT 353 Regression & Time series Analysis (P: MAT 351)
- 4 MAT 380 Actuarial Models I (P: B or better in MAT 280 and 350)
- 4 MAT 381/MAT 355 Actuarial Models II (P: B or better in MAT 380) or Generalized Linear Models & Predictive Modeling (P: MAT 351 (MAT 353 Rec.)
- 4 MAT 383 Actuarial Models III (P: B or better in MAT 280 and 350)
- 4 MAT 384 Actuarial Modeling (P: C or better in MAT 351)
- \_\_\_\_\_ 3 ACC 131 Financial Accounting (P: 12+ earned hours)
- \_\_\_\_\_ 3 ACC 132 Managerial Accounting (P: ACC 131)
- \_\_\_\_\_ 3 ECO 101 Principles of Microeconomics
- \_\_\_\_\_ 3 ECO 102 Principles of Macroeconomics
- 3 FIL 242 Investments (P: C or better in FIL 240)
   [FIL 240 P: MQM 100 (or ECO/POL/PSY 138); ACC 132; ECO 105 (or ECO 101 and 102)]
- 3 FIL 250 Introduction to Risk & Insurance
- 3 FIL 341 Intermediate Business Finance (P: C or better in FIL 240; FIL 218 or 241 or conc. reg.)

### Take one of the following courses:

- 4 IT 166 Python Programming for Science and Data Analysis (P: C or better in MAT 121 or 145 or GEO 238)
- \_\_\_\_\_ 4 IT 168 Structured Problem-Solving Using the Computer (P: MAT 104 or high school equivalent)

+ A grade of B or better required

### Mathematics Courses:

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

### 2019-2020 Catalog | Mathematics

### MAJOR IN MATHEMATICS STATISTICS SEQUENCE (B.A., B.S.)

### General Education (39 credit hours)

Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

### Communication and Composition (2 courses required)

3 COM 110 Communication as Critical Inquiry

\_\_\_\_ 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

### Mathematics (1 course required)

\_\_\_\_\_ 4 MAT 145 Calculus I

Natural Science/Natural Science Alternatives (2 courses required) Students must complete 1 course from 2 different sciences.

United States Traditions (1 course required)

Individuals & Civic Life (1 course required)

Fine Arts (1 course/3 credit hours required)\*\*\*

Humanities (1 course required)\*\*\*

Language in the Humanities (1 course required)\*\*\*

Quantitative Reasoning (1 course required) \_\_\_\_\_ 4 MAT 146 Calculus II

Science, Math, & Technology (1 course required) Exempt for Mathematics majors

Social Sciences (1 course required)\*\*\*

### **Additional Graduation Requirements**

\_\_\_\_/120 minimum total credit hours

\_\_\_\_/42 minimum senior college hours

\_\_\_ College of Arts & Sciences language requirement

### AMALI requirement

\*\*\*certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

\_\_\_\_\_ 4 MAT 147 Calculus III

4	MAT 145	Calculus I (P: C or beπer in MAT 144 or placemen
4	MAT 146	Calculus II (P: C or better in MAT 145)
4	MAT 147	Calculus III (P: C or better in MAT 146)
4	MAT 175	Elementary Linear Algebra (P: C or better in MAT
4	MAT 260	Discrete Mathematics (P: C or better in MAT 146)
4	MAT 350	Applied Probability Models (P: C or better in MAT
4	MAT 351	Statistics & Data Analysis (P: C or better in MAT 3
Take two	) (6-8 credit	hours) additional Statistics electives:
Only seni	or students	s with good standing will be allowed to take a grad
level cou	rse with ap	proval of the graduate School.
(NAAT 253		
Take one	3, 356, 450,   e of the follo	453, 455, 456, 458)
Take one	a, 356, 450, 	453, 455, 456, 458)
Take one	a, 356, 450, of the follor IT 165 Cc MAT 145 IT 168 St (P: MAT 1	453, 455, 456, 458) <b>pwing courses:</b> pomputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104)
Take one 4 4 Take two	a, 356, 450, of the follo IT 165 Cc MAT 145 IT 168 St (P: MAT 2 occurses fr	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of
Take one 4 4 4 Take two (12-13 cr	a, 356, 450, of the follo IT 165 Cc MAT 145 IT 168 St (P: MAT 2 courses fr edit hours)	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of additional courses:
Take one 4 4 Take two (12-13 cr Please co	<ul> <li>a 556, 450,</li> <li>a of the following of the following</li></ul>	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of additional courses: academic advisor.
Take one	a, 356, 450, a of the follo IT 165 Cc MAT 145 IT 168 St (P: MAT 1 o courses fr edit hours) IT SC 201, 20	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of additional courses: academic advisor. 03, 219, 305; Economics: ECO 225, 235, 238, 239,
Take one	<ul> <li>a 356, 450,</li> <li>a of the following of the following</li></ul>	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of additional courses: academic advisor. 03, 219, 305; Economics: ECO 225, 235, 238, 239, Psychology: PSY 230, 231, 233, 331, 334)
Take one                 Take two           (12-13 cr           Please co           (Biology:           241, 320,	<ul> <li>a, 356, 450,</li> <li>a of the following of the following</li></ul>	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of additional courses: academic advisor. 03, 219, 305; Economics: ECO 225, 235, 238, 239, Psychology: PSY 230, 231, 233, 331, 334)
Take one          4          4           Take two           (12-13 cr           Please co           (Biology:           241, 320,	<ul> <li>a 356, 450,</li> <li>a of the following of the following</li></ul>	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or better ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total of additional courses: academic advisor. D3, 219, 305; Economics: ECO 225, 235, 238, 239, Psychology: PSY 230, 231, 233, 331, 334)
Take one	a, 356, 450, of the follo IT 165 Cc MAT 145 IT 168 St (P: MAT 1 o courses fr edit hours) insult your BSC 201, 20 331, 339; 1	453, 455, 456, 458) owing courses: omputer Programming for Scientists (P: C or bette ) ructured Problem-Solving Using the Computer 104) om two different areas listed below for a total o additional courses: academic advisor. D3, 219, 305; Economics: ECO 225, 235, 238, 239, Psychology: PSY 230, 231, 233, 331, 334)

### **Mathematics Courses:**

https://coursefinder.illinoisstate.edu/directory/mat/

### All Courses:

# MAJOR IN MATHEMATICS STATISTICS SEQUENCE (B.A., B.S.)

### **Transfer Students**

### Illinois Articulation Initiative (min. 37 credit hours)

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

### Communication and Composition (3 courses required)

		•	•		-	•
A grade o	f C or bet	tter require	ed in ENG	101 and 1	L45 or	equivalents
3	C2 900	COM 110	Commun	ication as	Critica	al Inquiry

- 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- 3 C1 901 ENG 145 Writing in the Academic Disciplines

### Mathematics (1 course required)

Please see major requirements for mathematics options \_\_\_\_\_ 4 M1 900-1 MAT 145 Calculus I

### Physical & Life Sciences (2 courses/7-8 hours required)

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

### Humanities & Fine Arts (3 courses required)

At least 1 humanities and 1 fine arts course required

Social & Behavioral Sciences (3 courses required)

Two different disciplines must be represented

### **Additional Graduation Requirements**

/120 minimum total credit hours

\_\_/42 minimum senior college hours

College of Arts & Sciences language requirement

### AMALI requirement

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\*\*\*certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses. \_\_\_\_\_\_ 4 MAT 147 Calculus III

### Major (min. 50 credit hours)

 4	MAT 145	Calculus I (P: C or better in MAT 144 or placement)
 4	MAT 146	Calculus II (P: C or better in MAT 145)
 4	MAT 147	Calculus III (P: C or better in MAT 146)
 4	MAT 175	Elementary Linear Algebra (P: C or better in MAT 146)
 4	MAT 260	Discrete Mathematics (P: C or better in MAT 146)
 4	MAT 350	Applied Probability Models (P: C or better in MAT 147)
4	MAT 351	Statistics & Data Analysis (P: C or better in MAT 350)

### Take two (6-8 credit hours) additional Statistics electives:

Only senior students with good standing will be allowed to take a graduatelevel course with approval of the graduate School. (MAT 353, 356, 450, 453, 455, 456, 458)

(WAT 555, 550, 450, 455, 455, 450, 450)

### Take one of the following courses:

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- \_\_\_\_\_ 4 IT 165 Computer Programming for Scientists (P: C or better in MAT 145)
- 4 IT 168 Structured Problem-Solving Using the Computer (P: MAT 104)

# Take two courses from two different areas listed below for a total of four (12-13 credit hours) additional courses:

Please consult your academic advisor.

(Biology: BSC 201, 203, 219, 305; Economics: ECO 225, 235, 238, 239, 240, 241, 320, 331, 339; Psychology: PSY 230, 231, 233, 331, 334)

### Mathematics Courses:

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https://coursefinder.illinoisstate.edu/directory/mat/

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### All Courses: