MATH 002  **Introductory Algebra**  credit: 3 hours.
Methods of elementary algebra, including simplification of algebraic expressions, solving linear and quadratic equations, equations of lines, systems of linear equations, and radicals. Approved for Letter and S/U grading. Enrollment is restricted. Credit may not be used toward graduation at the University of Illinois. Prerequisite: Score on appropriate placement test, or consent of Mathematics Department.

This course is for students in the LAS Access and Achievement Program only.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tr>
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Restricted to EOAP Std Ath&Affil-LAS AAP, EOP - Obligatory, Pres Award Program Recip, President's Award Honors, or AAP - Undeclared students.
Restricted to Liberal Arts & Sciences.
Seats are reserved for LAS Access and Achievement Program, specifically EOP and PAP students in the biological sciences major in the College of Liberal Arts and Sciences. If you do not meet this requirement, please contact the Access and Achievement Program Office in 2002 Lincoln Hall to be placed on the LAS AAP waiting list. Open to LAS AAP Undeclared only to June 19.

MATH 101  **Thinking Mathematically**  credit: 3 hours.
Designed for students in majors that do not specifically require a mathematics course beyond the level of precalculus. Focus is on critical thinking and applications. All topics are covered from a contextual standpoint. Topics include proportional reasoning and modeling, functions, sets, consumer math, probability, and statistics. Other topics may be covered as time permits. Prerequisite: Three years of high school mathematics. Undergraduates only.

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<thead>
<tr>
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<tr>
<th>CRN</th>
<th>Type</th>
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<td>69244</td>
<td>Lecture-Discussion</td>
<td>BL1</td>
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<td>245 - Altgeld Hall</td>
<td>Reddy, A</td>
</tr>
</tbody>
</table>

Restricted to First Time Freshman students.
MATH 103  **Theory of Arithmetic**  credit: 4 hours.

Analyses of the mathematical issues and methodology underlying elementary mathematics in grades K-5. Topics include sets, arithmetic algorithms, elementary number theory, rational and irrational numbers, measurement, and probability. There is an emphasis on problem solving. Priority registration will be given to students enrolled in teacher education programs leading to certification in elementary or childhood education. Prerequisite: MATH 112 (formerly MATH 012) or equivalent.

Students must register for one lab and one lecture section.

This course satisfies the General Education Criteria for a: Quantitative Reasoning I

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
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<tr>
<td>32048</td>
<td>Laboratory</td>
<td>AB2</td>
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<td>F</td>
<td>14 - Illini Hall</td>
<td>Srikant, J</td>
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Quantitative Reasoning I course.

| 32065| Laboratory | AB3   | 01:00 PM - 01:50 PM | R    | 14 - Illini Hall | Srikant, J |

Quantitative Reasoning I course.

| 32051| Laboratory | AB4   | 02:00 PM - 02:50 PM | R    | 14 - Illini Hall | Srikant, J |

Quantitative Reasoning I course.

| 43834| Laboratory | AB5   | 01:00 PM - 01:50 PM | F    | 14 - Illini Hall | Srikant, J |

Quantitative Reasoning I course.

| 32067| Lecture   | AL1   | 08:00 AM - 09:20 AM | TR   | 253 - Mechanical Engineering Bldg | Hoffmeister, A |

Quantitative Reasoning I course.

Restricted to Education. Restricted to Special Education or Early Childhood Education or Elementary Education or Pre-Early Child/Elem Ed/Special Ed or Middle Grades Education major(s). Restricted to Undergrad - Urbana-Champaign.

Students transferring to the College of Education who need this course should contact the College of Education at saao@education.illinois.edu for specific information on the Education weekly information meetings and the process for requesting a seat in Math 103.

| 62939| Lecture   | AL2   | 09:30 AM - 10:50 AM | TR   | 253 - Mechanical Engineering Bldg | Hoffmeister, A |

Quantitative Reasoning I course.

Restricted to Education. Restricted to Special Education or Early Childhood Education or Elementary Education or Pre-Early Child/Elem Ed/Special Ed or Middle Grades Education major(s). Restricted to Undergrad - Urbana-Champaign.

Students transferring to the College of Education who need this course should contact the College of Education at saao@education.illinois.edu for specific information on the Education weekly information meetings and the process for requesting a seat in Math 103.

MATH 112  **Algebra**  credit: 3 hours.
Rapid review of basic techniques of factoring, rational expressions, equations and inequalities; functions and graphs; exponential and logarithm functions; systems of equations; matrices and determinants; polynomials; and the binomial theorem. Prerequisite: 1.5 units of high school algebra; 1 unit of high school geometry.

Students must register for one Lecture and one Discussion section.

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<thead>
<tr>
<th>CRN</th>
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<td>MWF</td>
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<td>Johnson, R</td>
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</table>

Restricted to Liberal Arts & Sciences.
Seats are reserved for LAS Access and Achievement Program students, specifically EOP and PAP students in the Liberal Arts and Sciences college. If you do not meet this requirement, please contact the Access and Achievement Program Office in 2002 Lincoln Hall to be placed on the LAS AAP waiting list. Open to LAS AAP Undeclared only to June 19.

Restricted to EOAP Std Ath&Affil-LAS AAP, EOP - Obligatory, Pres Award Program Recip, President's Award Honors, or AAP - Undeclared students.

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<tr>
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<td>Discussion/Recitation</td>
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<td>10:00 AM - 10:50 AM</td>
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<td>Discussion/Recitation</td>
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<td>Zomback, J</td>
</tr>
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</table>
This course is targeted at students whose ALEKS PPL math placement scores are between 50%-64%. Students with lower scores are strongly encouraged to work through the Learning Module until they have reached the level of mathematical knowledge expected for this course.

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MATH 115  Preparation for Calculus  credit: 3 hours.
Reviews trigonometric, rational, exponential, and logarithmic functions; provides a full treatment of limits, definition of derivative, and an introduction to finding area under a curve. Intended for students who need preparation for MATH 220, either because they lack the content background or because they are not prepared for the rigor of a university calculus course. Credit is not given for both MATH 115 and either MATH 014 or MATH 114. Credit is not given for MATH 115 if credit for either MATH 220 or MATH 221 has been earned. Prerequisite: An adequate ALEKS placement score as described at http://math.illinois.edu/ALEKS/, demonstrating knowledge of the topics of MATH 112.
Students must register for one Lecture and one Discussion section.
This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
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</table>

Quantitative Reasoning I course.
Restricted to Liberal Arts & Sciences.
Seats are reserved for LAS Access and Achievement Program, specifically EOP and PAP students in the College of Liberal Arts and Sciences. If you do not meet this requirement, please contact the Access and Achievement Program Office in 2002 Lincoln Hall to be placed on the LAS AAP waiting list. Placement in this course requires a recent U of I Math Placement Exam score of at least 65%. Failure to achieve the minimum score will result in removal from the course. For details see http://math.illinois.edu/ALEKS .
Open to LAS AAP Undeclared only to June 19
Restricted to EOAP Std Ath&Affil-LAS AAP, EOP - Obligatory, Pres Award Program Recip, President's Award Honors, or AAP - Undeclared students.

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<td>ADA</td>
<td>09:00 AM - 09:50 AM</td>
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Quantitative Reasoning I course.
For further information see http://www.math.uiuc.edu/timetable/
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<th>Course Code</th>
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<td>68448</td>
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<td>347 - Altgeld Hall</td>
<td>Jaffe, G</td>
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</table>

Quantitative Reasoning I course.

Quantitative Reasoning I course. Restricted to DGS Enrichment Experience students.
Quantitative Reasoning I course.

Placement in this course requires a recent U of I Math Placement Exam score of at least 65%. Failure to achieve the minimum score will result in removal from the course. For details see http://www.math.uiuc.edu/ALEKS/.

MATH 119  Ideas in Geometry  credit: 3 hours.
General education course in mathematics, for students who do not have mathematics as a central part of their studies. The goal is to convey the spirit of mathematical thinking through topics chosen mainly from plane geometry. Prerequisite: Two units of high school algebra; one unit of high school geometry; or equivalent.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
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<td>B1</td>
<td>09:00 AM - 09:50 AM</td>
<td>MWF</td>
<td>149 - Henry Administration Bldg</td>
<td>Ferguson, T</td>
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</tbody>
</table>

Quantitative Reasoning I course.
Not intended for Engineering or College of Business. Not intended for Physics or Chemical Engineering or Statistics or Mathematics or Statistics & Computer Science or Math & Computer Science major(s). Restricted to Undergrad - Urbana-Champaign.
This course is designed for students preparing to teach geometry at the elementary and middle grade levels. Assignments include math journals, papers, and presentations. Email mathadvising@illinois.edu with enrollment questions.

MATH 124  Finite Mathematics  credit: 3 hours.
Introduction to finite mathematics for students in the social sciences; introduces the student to the basic ideas of logic, set theory, probability, vectors and matrices, and Markov chains. Problems are selected from social sciences and business. Prerequisite: MATH 112 (formerly MATH 012) or an adequate ALEKS score.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

<table>
<thead>
<tr>
<th>CRN</th>
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<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tr>
<td>32037</td>
<td>Lecture-Discussion</td>
<td>L1</td>
<td>08:00 AM - 08:50 AM</td>
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<td>2 - Illini Hall</td>
<td>Sun, H</td>
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</table>

This section has combined evening exams. See http://www.math.uiuc.edu/timetable for the schedule. This section has a blended format in which part of the content is delivered in lecture and discussion, and part is delivered online. This course is restricted to the College of ACES until June 24, 2017 at 2:00 pm. Current Agri-Communication majors should e-mail mathadvising@illinois.edu with name, major, and UIN for a College override.

| 45900| Lecture-Discussion          | M1      | 09:00 AM - 09:50 AM | TR   | 2 - Illini Hall | Sun, H     |

This section has combined evening exams. See http://www.math.uiuc.edu/timetable for the schedule. This section has a blended format in which part of the content is delivered in lecture and discussion, and part is delivered online. This course is restricted to the College of ACES until June 24, 2017 at 2:00 pm. Current Agri-Communication majors should e-mail mathadvising@illinois.edu with name, major, and UIN for a College override.

| 32038| Lecture-Discussion          | N1      | 10:00 AM - 10:50 AM | TR   | 2 - Illini Hall | Song, Y    |

Quantitative Reasoning I course.
This section has combined evening exams. See http://www.math.uiuc.edu/timetable for the schedule. This section has a blended format in which part of the content is delivered in lecture and discussion, and part is delivered online. This course is restricted to the College of ACES until June 24, 2017 at 2:00 pm. Current Agri-Communication majors should e-mail mathadvising@illinois.edu with name, major, and UIN for a College override.

| 32040| Lecture-Discussion          | P1      | 11:00 AM - 11:50 AM | TR   | 1 - Illini Hall | Song, Y    |

Quantitative Reasoning I course.
This section has combined evening exams. See http://www.math.uiuc.edu/timetable for the schedule. This section has a blended format in which part of the content is delivered in lecture and discussion, and part is delivered online. This course is restricted to the College of ACES until June 24, 2017 at 2:00 pm. Current Agri-Communication majors should e-mail mathadvising@illinois.edu with name, major, and UIN for a College override.

| 32036| Lecture-Discussion          | R1      | 01:00 PM - 01:50 PM | TR   | 1 - Illini Hall | Pandey, A  |

Quantitative Reasoning I course.
This section has combined evening exams. See http://www.math.uiuc.edu/timetable for the schedule. This section has a blended format in which part of the content is delivered in lecture and discussion, and part is delivered online. This course is restricted to the College of ACES until June 24, 2017 at 2:00 pm. Current Agri-Communication majors should e-mail mathadvising@illinois.edu with name, major, and UIN for a College override.

| 58743| Lecture-Discussion          | S1      | 02:00 PM - 02:50 PM | TR   | 1 - Illini Hall | Pandey, A  |

Quantitative Reasoning I course.
This section has combined evening exams. See http://www.math.uiuc.edu/timetable for the schedule. This section has a blended format in which part of the content is delivered in lecture and discussion, and part is delivered online. This course is restricted to the College of ACES until June 24, 2017 at 2:00 pm. Current Agri-Communication majors should e-mail mathadvising@illinois.edu with name, major, and UIN for a College override.

MATH 125  **Elementary Linear Algebra**  credit: 3 hours.
Basic concepts and techniques of linear algebra; includes systems of linear equations, matrices, determinants, vectors in n-space, and eigenvectors, together with selected applications, such as Markov processes, linear programming, economic models, least squares, and population growth. Credit is not given for both MATH 125 and any of MATH 225, MATH 410, or MATH 415. Prerequisite: MATH 112 (formerly MATH 012) or an adequate ALEKS score.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
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<th>Instructor</th>
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<tbody>
<tr>
<td>32042</td>
<td>Lecture-Discussion</td>
<td>A1</td>
<td>08:00 AM - 08:50 AM</td>
<td>MWF</td>
<td>114 - David Kinley Hall</td>
<td>Petrickova, S</td>
</tr>
</tbody>
</table>

Restricted to College of Business through May 29. From May 30 - August 24 the restriction will change to all new first-time freshmen. Others may register starting August 25. Business students who need to add the class after May 29, 2017 should email mathadvising@illinois.edu with their name, UIN, and college.

<table>
<thead>
<tr>
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<tr>
<td>56122</td>
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<td>F1</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
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</table>

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</table>

Restricted to College of Business through May 29. From May 30 - August 24 the restriction will change to all new first-time freshmen. Others may register starting August 25. Business students who need to add the class after May 29, 2017 should email mathadvising@illinois.edu with their name, UIN, and college.

**MATH 181 A Mathematical World**  credit: 3 hours.

Introduction to selected areas of mathematical sciences through application to modeling and solution of problems involving networks, circuits, trees, linear programming, random samples, regression, probability, inference, voting systems, game theory, symmetry and tilings, geometric growth, comparison of algorithms, codes and data management. Prerequisite: Three years of high school mathematics, including two years of algebra and one year of geometry.

This course satisfies the General Education Criteria for a: Quantitative Reasoning I

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<td>F1</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>343 - Altgeld Hall</td>
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</table>

Quantitative Reasoning I course.
Not intended for Engineering or Graduate College. Not intended for Mathematics or Actuarial Science major(s).
Math majors may register only with the permission of the department. Please email mathadvising@illinois.edu with name, UIN, and reason if a math major has a legitimate reason for wishing to take this course aimed at non-mathematical students.

**MATH 199 Undergraduate Open Seminar**  credit: 1 TO 5 hours.

Approved for both letter and S/U grading. May be repeated.

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<td>10551</td>
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### 47745 Lecture-Discussion CHP 04:00 PM - 05:20 PM TR 243 - Altgeld Hall Hildebrand, A

Credit Hours: 3 hours
Probability and the Real World
Camp Honors/Chanc Schol course.
Special Topic:"Probability and the Real World" For Chancellor's Scholars only; other may enroll with the consent of the instructor and the Campus Honors Program. Restricted to Chancellor's Scholar-CHPHonors students.

### 63785 Lecture-Discussion CS 01:00 PM - 02:50 PM MW 239 - Altgeld Hall Buysse, K

Credit Hours: 3 hours
Foundations of Data Management
Restricted to Actuarial Science major(s).
Introduction to Excel/VBA and SQL targeted at actuarial science freshmen. This course is an alternative to CS 105. Restricted to First Time Freshman students.

### 65503 Lecture-Discussion GS1 03:00 PM - 04:50 PM R 7 - Illini Hall Fulan, B

Credit Hours: 1 hours
Restricted to DGS Enrichment Experience students.

### 54467 Discussion/Recitation JMD 01:00 PM - 02:50 PM T 14 - Illini Hall Monical, C

Credit Hours: 1 hours
Departmental Approval Required
For Math 285 Merit Workshop students only. Students must also register for Math 285 Lecture C1 (CRN 51206). For further information see http://www.math.uiuc.edu/timetable/

### 50395 Discussion/Recitation JMM 11:00 AM - 12:50 PM R 14 - Illini Hall Weigandt, A

Credit Hours: 1 hours
Departmental Approval Required
For Math 115 Merit Workshop students only. For further information see http://www.math.uiuc.edu/timetable/

### 50397 Discussion/Recitation JMT 01:00 PM - 02:50 PM R 136 - Loomis Laboratory Heath, E

Credit Hours: 1 hours
Departmental Approval Required
For Math 115 Merit Workshop students only. For further information see http://www.math.uiuc.edu/timetable/

### 51989 Discussion/Recitation JMW 03:00 PM - 04:50 PM R 14 - Illini Hall Burson, H

Credit Hours: 1 hours
Departmental Approval Required
For Math 115 Merit Workshop students only. For further information see http://www.math.uiuc.edu/timetable/

### 66716 Lecture-Discussion SFH 09:30 AM - 10:50 AM TR 212 - 1205 W Oregon Palmore, J

Credit Hours: 3 hours
Spaceflight
Camp Honors/Chanc Schol course.
MATH 210  **Theory of Interest**  credit: 3 hours.
Study of compound interest and annuities; applications to problems in finance. Prerequisite: MATH 231 or equivalent.

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Enrollment restricted to current actuarial science majors April 3 - April 20. Class will be unrestricted during business hours the morning of April 21, 2017. Prospective transfers should review [http://www.math.illinois.edu/ActuarialScience/transfer-to-actsci-ui-only.pdf](http://www.math.illinois.edu/ActuarialScience/transfer-to-actsci-ui-only.pdf) Prospective transfers who are not able to register on April 21 should fill out the form here by August 24 to be added to the request list: [http://go.illinois.edu/MATH210FA17](http://go.illinois.edu/MATH210FA17) After August 24, please send name, netid, 9-digit UIN, and reason for request to mathadvising@illinois.edu.

MATH 213  **Basic Discrete Mathematics**  credit: 3 hours.
Beginning course on discrete mathematics, including sets and relations, functions, basic counting techniques, recurrence relations, graphs and trees, and matrix algebra; emphasis throughout is on algorithms and their efficacy. Credit is not given for both MATH 213 and CS 173. Prerequisite: MATH 220 or MATH 221, or equivalent.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quantitative Reasoning II course.

MATH 220  **Calculus**  credit: 5 hours.
First course in calculus and analytic geometry; basic techniques of differentiation and integration with applications including curve sketching; antidifferentiation, the Riemann integral, fundamental theorem, exponential and trigonometric functions. Credit is not given for both MATH 220 and either MATH 221 or MATH 234. Prerequisite: An adequate ALEKS placement score as described at [http://math.illinois.edu/ALEKS/](http://math.illinois.edu/ALEKS/), demonstrating knowledge of topics of MATH 115. Students with previous calculus experience should consider MATH 221.

Students must register for one discussion and one lecture section beginning with the same letter in Fall and Spring terms only. Engineering students must obtain a dean's approval to drop this course after the second week of instruction.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

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Quantitative Reasoning I course.
Departmental Approval Required
For Merit Workshop students only. For further information see http://www.math.uiuc.edu/timetable/
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Quantitative Reasoning I course.

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Quantitative Reasoning I course.

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Quantitative Reasoning I course. (For Unit One and other LLC students only. Placement in this course requires a recent U of I Math Placement Exam score of at least 80%. Failure to achieve the minimum score will result in removal from the course. For details see http://math.illinois.edu/ALEKS)

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Quantitative Reasoning I course. (Placement in this course requires a recent U of I Math Placement Exam score of at least 80%. Failure to achieve the minimum score will result in removal from the course. For details see http://math.illinois.edu/ALEKS)

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Quantitative Reasoning I course. (Placement in this course requires a recent U of I Math Placement Exam score of at least 80%. Failure to achieve the minimum score will result in removal from the course. For details see http://math.illinois.edu/ALEKS)

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Quantitative Reasoning I course. (Placement in this course requires a recent U of I Math Placement Exam score of at least 80%. Failure to achieve the minimum score will result in removal from the course. For details see http://math.illinois.edu/ALEKS)

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Quantitative Reasoning I course.

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Quantitative Reasoning I course. (Restricted to Food Science & Human Nutrition or Natural Resrcs & Environ Sci or Natural Res & Env Sciences or Biology or Kinesiology or Molecular and Cellular Biology or Integrative Biology major(s). This newly designed section is offered to students in Biology, IB, MCB, and related life science majors who are interested in seeing mathematical ideas being directly applied to exciting biological problems. While the material consists of standard Math 220 topics, it will be taught with examples from the biological sciences using a special life sciences math textbook. It will include an introduction to...
R. Placement in this course requires an adequate, recent score on the U of I ALEKS math placement exam, as described at http://math.illinois.edu/ALEKS Students planning to transfer to a life sciences major may e-mail mathadvising@illinois.edu with name, netid, UIN, current major, and "BioCalculus approval request" in order to request registration approval, space permitting.

**MATH 221  Calculus I  credit: 4 hours.**

First course in calculus and analytic geometry for students with some calculus background; basic techniques of differentiation and integration with applications including curve sketching; antidifferentiation, the Riemann integral, fundamental theorem, exponential and trigonometric functions. Credit is not given for both MATH 221 and either MATH 220 or MATH 234. Prerequisite: An adequate ALEKS placement score as described at http://math.illinois.edu/ALEKS/ and either one year of high school calculus or a minimum score of 2 on the AB Calculus AP exam.

Students must register for one discussion and one lecture section beginning with the same letter. Engineering students must obtain a dean's approval to drop this course after the second week of instruction.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

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Quantitative Reasoning I course.
Placement in this course requires a recent U of I Math Placement Exam score of at least 80%. Failure to achieve the minimum score will result in removal from the course. For details see [http://www.math.uiuc.edu/ALEKS/](http://www.math.uiuc.edu/ALEKS/).

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Quantitative Reasoning I course.
Departmental Approval Required
For Merit Workshop students only. For further information see [http://www.math.uiuc.edu/timetable/](http://www.math.uiuc.edu/timetable/)

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Quantitative Reasoning I course.
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Quantitative Reasoning I course.
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Quantitative Reasoning I course.

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Quantitative Reasoning I course.

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Quantitative Reasoning I course.

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Quantitative Reasoning I course.

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Quantitative Reasoning I course.

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MATH 225  **Introductory Matrix Theory**  credit: 2 hours.

Systems of linear equations, matrices and inverses, determinants, and a glimpse at vector spaces, eigenvalues and eigenvectors. Credit is not given for both MATH 225 and any of MATH 125, MATH 410, or MATH 415. Prerequisite: MATH 220 or MATH 221; or equivalent.
Engineering students must obtain a dean's approval to drop this course after the second week of instruction.

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Not intended for Graduate - Urbana-Champaign.
Meets 23-Oct-17 - 13-Dec-17.

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MATH 231  Calculus II  credit: 3 hours.
Second course in calculus and analytic geometry: techniques of integration, conic sections, polar coordinates, and infinite series.
Prerequisite: MATH 220 or MATH 221.

Students must register for one discussion and one lecture section beginning with the same letter in Fall and Spring terms only.
Engineering students must obtain a dean's approval to drop this course after the second week of instruction.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

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Quantitative Reasoning I course.
Departmental Approval Required
For Merit Workshop students only. For further information see http://www.math.uiuc.edu/timetable/

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Not intended for Computer Engineering or Computer Science or Electrical Engineering or Engineering Mechanics or General Engineering or Industrial Engineering or Mechanical Engineering or Physics or Chemical Engineering or Statistics & Computer Science or Math & Computer Science or Agricultural & Biological Engr or Computer Sci & Anthropology major(s). New freshmen in Engineering or Engineering-rate majors must enroll in lecture EL1 or EL2. Continuing students in Engineering who register after May 25, 2017, should e-mail mathadvising@illinois.edu with name, UIN, and continuing status to receive an override.
Quantitative Reasoning I course.
Not intended for Computer Engineering or Computer Science or Electrical Engineering or Engineering Mechanics or General Engineering or Industrial Engineering or Mechanical Engineering or Physics or Chemical Engineering or Statistics & Computer Science or Math & Computer Science or Agricultural & Biological Engr or Computer Sci & Anthropology major(s).
New freshmen in Engineering or Engineering-rate majors must enroll in lecture EL1 or EL2. Continuing students in Engineering who register after May 25, 2017, should e-mail mathadvising@illinois.edu with name, UIN, and continuing status to receive an override.

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Quantitative Reasoning I course.

Restricted to Civil Engineering or Computer Engineering or Computer Science or Electrical Engineering or Engineering Mechanics or Engineering Physics or General Engineering or Industrial Engineering or Materials Science & Engr or Mechanical Engineering or Physics or Chemical Engineering or Bioengineering or Statistics & Computer Science or Math & Computer Science or Aerospace Engineering or Agricultural & Biological Engr or Nuclear, Plasma, Radiolgc Engr or Engineering Undeclared or Computer Sci & Anthropology or Computer Sci & Astronomy or Computer Sci & Chemistry or Computer Sci & Linguistics or Systems Engineering and Design or Pre-Engineering major(s).
Restricted to new freshmen in the College of Engineering and certain other majors. Students registering for this course must add three CRNs at the same time on the Add/Drop page (not the Class Lookup) to get into the class: 46880 for the lecture, 50014 for the extra credit, and one more for an ED discussion. Restricted to First Time Freshman students. Must enroll concurrently in MATH 299 50014.

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Quantitative Reasoning I course.
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Restricted to new freshmen in the College of Engineering and certain other majors. Students registering for this course must add three CRNs at the same time on the Add/Drop page (not the Class Lookup) to get into the class: 46897 for the lecture, 50015 for the extra credit, and one more for an ED discussion. Restricted to First Time Freshman students. Must enroll concurrently in MATH 299 50015.

MATH 241 Calculus III credit: 4 hours.
Third course in calculus and analytic geometry including vector analysis: Euclidean space, partial differentiation, multiple integrals, line integrals and surface integrals, the integral theorems of vector calculus. Credit is not given for both MATH 241 and MATH 292. Prerequisite: MATH 231.
Students must register for one discussion and one lecture section beginning with the same letter in Fall and Spring terms only. Engineering students must obtain a dean's approval to drop this course after the second week of instruction.
This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quantitative Reasoning II course. Departmental Approval Required For Merit Workshop students only. Departmental approval required. For further information see http://www.math.uiuc.edu/timetable/

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Quantitative Reasoning II course. Departmental Approval Required For Merit Workshop students only. Departmental approval required. For further information see http://www.math.uiuc.edu/timetable/

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Quantitative Reasoning II course.

For Unit One and other LLC students only.
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Quantitative Reasoning II course.
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Quantitative Reasoning II course.

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Quantitative Reasoning II course.

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Quantitative Reasoning II course.

Not intended for Graduate - Urbana-Champaign.
Honors section. Grade of A in Math 231 or score of 5 on AP Calculus BC exam required. Not all qualified students will get seats in honors calculus, so incoming freshmen should register for a regular section as a backup plan. The course will open to students with a 5 on AP Calculus BC at 9:00am on Friday, August 25. Continuing students with an A in Math 231 should email mathadvising@illinois.edu with name, UIN, and reason for interest to request approval for this section. Students with a 6 or 7 on the IB Further Math HL should also contact mathadvising@illinois.edu.

MATH 285 Intro Differential Equations credit: 3 hours.
Techniques and applications of ordinary differential equations, including Fourier series and boundary value problems, and an introduction to partial differential equations. Intended for engineering majors and others who require a working knowledge of differential equations. Credit is not given for both MATH 285 and any of MATH 284, MATH 286, MATH 441. Prerequisite: MATH 241.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quantitative Reasoning II course.
Not intended for Computer Engineering or Electrical Engineering major(s).

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Quantitative Reasoning II course.
Not intended for Computer Engineering or Electrical Engineering major(s).

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Quantitative Reasoning II course.
Not intended for Computer Engineering or Electrical Engineering major(s).
MATH 286  Intro to Differential Eq Plus  credit: 4 hours.

Techniques and applications of ordinary differential equations, including Fourier series and boundary value problems, linear systems of differential equations, and an introduction to partial differential equations. Covers all the MATH 285 plus linear systems. Intended for engineering majors and other who require a working knowledge of differential equations. Credit is not given for both MATH 286 and any of MATH 284, MATH 285, MATH 441. Prerequisite: MATH 241.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quantitative Reasoning II course.
Registration is restricted to students majoring in Electrical and Computer Engineering until the morning of April 24, 2017. Students interested in transfer to ECE should be in contact with ece-advisor@illinois.edu. A few seats are being held for new transfer students and will not be released until the Friday before classes start.

<table>
<thead>
<tr>
<th>CRN</th>
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Quantitative Reasoning II course.
Registration is restricted to students majoring in Electrical and Computer Engineering until the morning of April 24, 2017. Students interested in transfer to ECE should be in contact with ece-advisor@illinois.edu. A few seats are being held for new transfer students and will not be released until the Friday before classes start.

MATH 299  Topics in Mathematics  credit: 1 TO 4 hours.

Topics course; see Class Schedule or department office for current topics. May be repeated in the same or subsequent semesters to a maximum of 8 hours. Prerequisite: MATH 220 or MATH 221; consent of instructor.

<table>
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Credit Hours: 1 hours
Restricted to First Time Freshman students.
Must enroll concurrently in MATH 231 46880.

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Credit Hours: 1 hours
Restricted to First Time Freshman students.
Must enroll concurrently in MATH 231 46897.

MATH 347  Fundamental Mathematics  credit: 3 hours.

Fundamental ideas used in many areas of mathematics. Topics will include: techniques of proof, mathematical induction, binomial coefficients, rational and irrational numbers, the least upper bound axiom for real numbers, and a rigorous treatment of convergence of sequences and series. This will be supplemented by the instructor from topics available in the various texts. Students will regularly write proofs emphasizing precise reasoning and clear exposition. Credit is not given for both MATH 347 and MATH 348. Prerequisite: MATH 231.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

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Departmental Approval Required Quantitative Reasoning II course.
Enrollment in this honors section is restricted to students who have shown excellence in mathematics. To request permission for this section please go to http://go.illinois.edu/FA17MATH347H and fill out the information requested. Students who have demonstrated excellence in mathematics may use this section for James Scholar credit, but the section is not restricted to James Scholars.

<table>
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Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>66654</td>
<td>C2M</td>
<td>10:00 AM - 10:50 AM</td>
<td>WF</td>
<td>143 - Henry Administration Bldg</td>
<td>Sisneros-Thiry, S Tolman, S</td>
</tr>
</tbody>
</table>

Departmental Approval Required Quantitative Reasoning II course.
This section is reserved for students who are working towards the Secondary Education minor and/or have participated in the Math Merit Program. Please contact mathadvising@illinois.edu with questions.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>65074</td>
<td>D1</td>
<td>11:00 AM - 11:50 AM</td>
<td>MWF</td>
<td>140 - Henry Administration Bldg</td>
<td>Culver, D</td>
</tr>
</tbody>
</table>

Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

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<thead>
<tr>
<th>Course Code</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>34450</td>
<td>E1</td>
<td>01:00 PM - 01:50 PM</td>
<td>MWF</td>
<td>447 - Altgeld Hall</td>
<td>Lutzer, D</td>
</tr>
</tbody>
</table>

Quantitative Reasoning II course.
Not intended for Graduate - Urbana-Champaign.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to
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<tr>
<th>Course</th>
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<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>34383</td>
<td>F1</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>145 - Altgeld Hall</td>
<td>Kutzarova-Ford, D</td>
</tr>
</tbody>
</table>

Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

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<thead>
<tr>
<th>Course</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>34395</td>
<td>G1</td>
<td>03:00 PM - 03:50 PM</td>
<td>MWF</td>
<td>147 - Altgeld Hall</td>
<td>Kutzarova-Ford, D</td>
</tr>
</tbody>
</table>

Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>34504</td>
<td>P1H</td>
<td>11:00 AM - 12:20 PM</td>
<td>TR</td>
<td>145 - Altgeld Hall</td>
<td>Tserunyan, A</td>
</tr>
</tbody>
</table>

Departmental Approval Required
James Scholars, and Quantitative Reasoning II course.
Not intended for Graduate - Urbana-Champaign.
Enrollment in this honors section is restricted to students who have shown excellence in mathematics. To request permission for this section please go to http://go.illinois.edu/FA17MATH347H and fill out the information requested. Students who have demonstrated excellence in mathematics may use this section for James Scholar credit, but the section is not restricted to James Scholars. Math 347 is restricted to Mathematics and Math/CS majors until the morning of April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>34444</td>
<td>X1</td>
<td>12:00 PM - 12:50 PM</td>
<td>MWF</td>
<td>141 - Altgeld Hall</td>
<td>Walsberg, E</td>
</tr>
</tbody>
</table>

Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

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<tr>
<th>Course</th>
<th>Lecture-Discussion</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>67249</td>
<td>X2</td>
<td>12:00 PM - 12:50 PM</td>
<td>MWF</td>
<td>441 - Altgeld Hall</td>
<td>Culver, D</td>
</tr>
</tbody>
</table>

Quantitative Reasoning II course.
Math 347 is restricted to Mathematics and Math/CS majors. Major restrictions will be removed between 1-3pm on April 25, 2017. Contact mathadvising@illinois.edu if you have questions. Math minors may attempt to register for this class on April 25, 2017; however admission to the minor does not guarantee a seat in any math course. Students completing Math 241 and hoping to transfer to a mathematics major should make an appointment with a math advisor during early registration. Some seats are reserved for math transfer students and will not be released until late August.

MATH 357 Numerical Methods I credit: 3 hours.
Same as CS 357. See CS 357.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>53281</td>
<td>Lecture-Discussion</td>
<td>M</td>
<td>09:30 AM - 10:45 AM</td>
<td>TR</td>
<td>1320 - Digital Computer Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>63537</td>
<td>Lecture-Discussion</td>
<td>N</td>
<td>12:30 PM - 01:45 PM</td>
<td>TR</td>
<td>2079 - Natural History Building</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours

**MATH 362  Probability with Engrg Applic**  credit: 3 hours.
Same as ECE 313. See ECE 313.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>64889</td>
<td>Discussion/Recitation</td>
<td>A</td>
<td>09:00 AM - 09:50 AM</td>
<td>MWF</td>
<td>3015 - Electrical &amp; Computer Eng Bldg</td>
<td>Zhao, Z</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>54661</td>
<td>Discussion/Recitation</td>
<td>B</td>
<td>10:00 AM - 10:50 AM</td>
<td>MWF</td>
<td>3015 - Electrical &amp; Computer Eng Bldg</td>
<td>Milenkovic, O</td>
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</tbody>
</table>

Credit Hours: 3 hours
Not intended for Graduate - Urbana-Champaign.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>54663</td>
<td>Discussion/Recitation</td>
<td>C</td>
<td>11:00 AM - 11:50 AM</td>
<td>MWF</td>
<td>3017 - Electrical &amp; Computer Eng Bldg</td>
<td>Varshney, L</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
Not intended for Graduate - Urbana-Champaign.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>54664</td>
<td>Discussion/Recitation</td>
<td>D</td>
<td>01:00 PM - 01:50 PM</td>
<td>MWF</td>
<td>3017 - Electrical &amp; Computer Eng Bldg</td>
<td>Kang, X</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
Not intended for Graduate - Urbana-Champaign.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>61648</td>
<td>Discussion/Recitation</td>
<td>E</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>3017 - Electrical &amp; Computer Eng Bldg</td>
<td>Lu, Y</td>
</tr>
</tbody>
</table>

MATH 370  Actuarial Problem Solving  credit: 1 hours.
Methods and techniques of solving problems in actuarial mathematics for advanced students intending to enter the actuarial profession. Approved for S/U grading only. May be repeated in the same or separate terms to a maximum of 4 hours. Prerequisite: Consent of instructor.
Students planning to sit for the "Course 1" Actuarial exam should register for section X. This will carry a 1 hour credit only.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>69249</td>
<td>Conference</td>
<td>CS</td>
<td>07:00 PM - 08:50 PM</td>
<td>R</td>
<td>239 - Altgeld Hall</td>
<td>Feng, R</td>
</tr>
</tbody>
</table>

Provides students with a basic overview of the programming languages used in statistical and actuarial analysis. May include VBA, SQL, SAS, R and Python. Student are expected to have a working knowledge of Excel.

<table>
<thead>
<tr>
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<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>32097</td>
<td>Conference</td>
<td>FM</td>
<td>07:00 PM - 08:50 PM</td>
<td>T</td>
<td>245 - Altgeld Hall</td>
<td>Feng, R</td>
</tr>
</tbody>
</table>

This section is for students preparing for Exam 2/FM. Students are expected to be enrolled in or have completed Math 210.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>32094</td>
<td>Conference</td>
<td>MFE</td>
<td>07:00 PM - 08:50 PM</td>
<td>T</td>
<td>243 - Altgeld Hall</td>
<td>Feng, R</td>
</tr>
</tbody>
</table>

Students who are expecting to take Exam 3F/MFE after the semester. Students are expected to be enrolled in or have completed MATH 241, MATH 210, MATH 408, and MATH 476

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>32086</td>
<td>Conference</td>
<td>P</td>
<td>07:00 PM - 08:50 PM</td>
<td>M</td>
<td>245 - Altgeld Hall</td>
<td>Feng, R</td>
</tr>
</tbody>
</table>

Credit Hours: 1 hours
This section is for students preparing for Exam 1/P. Students are expected to be enrolled in or have completed Math 408, Stat 400, or Math 461.

**MATH 390  Individual Study  credit: 0 TO 3 hours.**
Guided individual study of advanced topics not covered in other courses. May be repeated to a maximum of 8 hours. Approved for both letter and S/U grading. Prerequisite: Consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>10553</td>
<td>Independent Study</td>
<td></td>
<td>ARRANGED -</td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Instructor Approval Required
Registration will only be accepted until the 5th week of classes

**MATH 399  Math/Actuarial Internship  credit: 0 hours.**
Full-time or part-time practice of math or actuarial science in an off-campus government, industrial, or research laboratory environment. Summary report required. Approved for S/U grading only. May be repeated in separate terms. Prerequisite: After obtaining an internship, Mathematics majors must request entry from the Mathematics Director of Undergraduate Studies; Actuarial Science majors must request entry from the Director of the Actuarial Science Program.

<table>
<thead>
<tr>
<th>CRN</th>
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<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>61957</td>
<td>Conference</td>
<td>A</td>
<td>ARRANGED -</td>
<td></td>
<td>-</td>
<td>McCarthy, R</td>
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Departmental Approval Required

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
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<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>59202</td>
<td>Conference</td>
<td>M</td>
<td>ARRANGED -</td>
<td></td>
<td>-</td>
<td>McCarthy, R</td>
</tr>
</tbody>
</table>

Departmental Approval Required
MATH 402  **Non Euclidean Geometry**  credit: 3 OR 4 hours.

Historical development of geometry; includes tacit assumptions made by Euclid; the discovery of non-Euclidean geometries; geometry as a mathematical structure; and an axiomatic development of plane geometry. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; MATH 347 or MATH 348, or equivalent; or consent of instructor.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

<table>
<thead>
<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>32102</td>
<td>Lecture-Discussion</td>
<td>F13</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>243 - Altgeld Hall</td>
<td>Cliff, E</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
Quantitative Reasoning II course.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
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<tbody>
<tr>
<td>39113</td>
<td>Lecture-Discussion</td>
<td>F14</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>243 - Altgeld Hall</td>
<td>Cliff, E</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Quantitative Reasoning II course.
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>32099</td>
<td>Lecture-Discussion</td>
<td>X13</td>
<td>12:00 PM - 12:50 PM</td>
<td>MWF</td>
<td>347 - Altgeld Hall</td>
<td>Cliff, E</td>
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</tbody>
</table>

Credit Hours: 3 hours
Quantitative Reasoning II course.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>39112</td>
<td>Lecture-Discussion</td>
<td>X14</td>
<td>12:00 PM - 12:50 PM</td>
<td>MWF</td>
<td>347 - Altgeld Hall</td>
<td>Cliff, E</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Quantitative Reasoning II course.
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

MATH 403  **Euclidean Geometry**  credit: 3 OR 4 hours.

Selected topics from geometry, including the nine-point circle, theorems of Cera and Menelaus, regular figures, isometries in the plane, ordered and affine geometries, and the inversive plane. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; MATH 347 or 348, or equivalent; or consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
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<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>30344</td>
<td>Lecture-Discussion</td>
<td>X13</td>
<td>12:00 PM - 12:50 PM</td>
<td>MWF</td>
<td>143 - Altgeld Hall</td>
<td>Mineyev, I</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
MATH 405  **Teacher's Course**  credit: 3 OR 4 hours.

In-depth, advanced perspective look at selected topics covered in the secondary curriculum. Connects mathematics learned at the university level to content introduced at the secondary level. Intended for students who plan to seek a secondary certificate in mathematics teaching. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; MATH 347 or MATH 348, or equivalent; or consent of instructor.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>54459</td>
<td>Lecture-Discussion</td>
<td>B13</td>
<td>09:00 AM - 10:20 AM</td>
<td>MW</td>
<td>140 - Henry Administration Bldg</td>
<td>Hoffmeister, A</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
Quantitative Reasoning II course.
Departmental Approval Required
Restricted to Mathematics major(s).
Restricted to undergraduates in the third or later year of the secondary education program, and to graduates in the secondary education program. Other advanced students interested in math teaching are welcome to request approval by contacting mathadvising@illinois.edu with name, netid, UIN, and a short note about teaching plans and preparation.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>54460</td>
<td>Lecture-Discussion</td>
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<td>MW</td>
<td>140 - Henry Administration Bldg</td>
<td>Hoffmeister, A</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Quantitative Reasoning II course.
Departmental Approval Required
Restricted to Mathematics major(s).

MATH 409  **Actuarial Statistics II**  credit: 4 hours.

Same as STAT 409. See STAT 409.

<table>
<thead>
<tr>
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<th>Days</th>
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</table>
MATH 410  **Lin Algebra & Financial Apps**  credit: 3 OR 4 hours.

Emphasizes techniques of linear algebra and introductory and advanced applications to actuarial science, finance and economics. Topics include linear equations, matrix theory, vector spaces, linear transformations, eigenvalues and eigenvectors and inner product spaces. In addition, current research topics such as modeling, data mining, and generalized linear models are explored. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 410 and any of MATH 125, MATH 225, MATH 415 or MATH 416. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; MATH 210 or FIN 221; or consent of instructor.

<table>
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</table>

Credit Hours: 3 hours
This course is restricted to current Actuarial Science majors initially, but the restriction will be removed during business hours on April 20, 2017. Students interested in a transfer to actuarial science should see [http://www.math.illinois.edu/ActuarialScience/transfer-to-actsci-ui-only.pdf](http://www.math.illinois.edu/ActuarialScience/transfer-to-actsci-ui-only.pdf)

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</table>

Credit Hours: 4 hours
Departmental Approval Required
Restricted to Actuarial Science major(s). Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

MATH 412  **Graph Theory**  credit: 3 OR 4 hours.

Examines basic concepts and applications of graph theory, where graph refers to a set of vertices and edges that join some pairs of vertices; topics include subgraphs, connectivity, trees, cycles, vertex and edge coloring, planar graphs and their colorings. Draws applications from computer science, operations research, chemistry, the social sciences, and other branches of mathematics, but emphasis is placed on theoretical aspects of graphs. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 347 or MATH 348 or equivalent experience or CS 374.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

<table>
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<tr>
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Credit Hours: 3 hours
Quantitative Reasoning II course.
This course is restricted to Mathematics and Math&CS majors initially, but the restriction will be removed during business hours on April 18, 2017.

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Credit Hours: 4 hours  
Quantitative Reasoning II course.  
Instructor Approval Required  
Restricted to Mathematics or Math & Computer Science major(s). Restricted to Graduate - Urbana-Champaign.  
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

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Credit Hours: 3 hours  
Quantitative Reasoning II course.  
This course is restricted to Mathematics and Math&CS majors initially, but the restriction will be removed during business hours on April 18, 2017.

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Credit Hours: 4 hours  
Quantitative Reasoning II course.  
Instructor Approval Required  
Restricted to Graduate - Urbana-Champaign.  
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

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Credit Hours: 3 hours  
This course is restricted to Mathematics majors initially, but the restriction will be removed during business hours on April 18, 2017.

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Credit Hours: 4 hours  
Departmental Approval Required  
Restricted to Graduate - Urbana-Champaign.  
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

MATH 413 Intro to Combinatorics  credit: 3 OR 4 hours.  
Permutations and combinations, generating functions, recurrence relations, inclusion and exclusion, Pólya's theory of counting, and block designs. Same as CS 413. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Prerequisite: MATH 347 or MATH 348 or equivalent experience.

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Credit Hours: 3 hours  
This course is restricted to Mathematics majors initially, but the restriction will be removed during business hours on April 18, 2017.

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Credit Hours: 4 hours  
Departmental Approval Required  
Restricted to Graduate - Urbana-Champaign.  
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

MATH 415 Applied Linear Algebra  credit: 3 or 4 hours.  
Introductory course emphasizing techniques of linear algebra with applications to engineering; topics include matrix operations, determinants, linear equations, vector spaces, linear transformations, eigenvalues, and eigenvectors, inner products and norms, orthogonality, equilibrium, and linear dynamical systems. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 415 and any of MATH 125, MATH 225, MATH 410, or MATH 416. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241 or consent of instructor.
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<td>Li, J</td>
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</table>
MATH 416  Abstract Linear Algebra  credit: 3 OR 4 hours.

Rigorous proof-oriented course in linear algebra. Topics include determinants, vector spaces over fields, linear transformations, inner product spaces, eigenvectors and eigenvalues, Hermitian matrices, Jordan Normal Form, 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 416 and either MATH 410 or MATH 415. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241 or consent of instructor; MATH 347 is recommended.

<table>
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</table>

Credit Hours: 3 hours
This course is restricted to Mathematics majors initially, but the restriction will be removed during the morning of April 18, 2017.

<table>
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<td>MWF</td>
<td>347 - Altgeld Hall</td>
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<tbody>
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<td>01:00 PM - 01:50 PM</td>
<td>MWF</td>
<td>445 - Altgeld Hall</td>
<td>Deville, R</td>
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<td>This section will open, without restrictions, at 1pm on Wednesday, May 10th.</td>
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<td>MWF</td>
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<td>Deville, R</td>
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<tbody>
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<td>55582</td>
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<td>M13</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>143 - Altgeld Hall</td>
<td>Tumanov, A</td>
</tr>
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<tr>
<td>Credit Hours: 3 hours</td>
<td>This course is restricted to Mathematics majors initially, but the restriction will be removed during the morning of April 18, 2017</td>
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<td>Credit Hours: 4 hours</td>
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</table>
MATH 417  **Intro to Abstract Algebra**  credit: 3 OR 4 hours.

Fundamental theorem of arithmetic, congruences, Permutations, Groups and subgroups, homomorphisms, Group actions with applications. Polynomials. Rings, subrings, and ideals. Integral domains and fields. Roots of polynomials. Maximal ideals, construction of fields. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: Either MATH 416 or one of MATH 410, MATH 415 together with one of MATH 347, MATH 348, CS 374; or consent of instructor.

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<tr>
<th>CRN</th>
<th>Type</th>
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<td>65076</td>
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<td>MWF</td>
<td>345 - Altgeld Hall</td>
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</table>

Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

Credit Hours: 3 hours
This course is restricted to Mathematics majors initially, but the restriction will be removed during the morning of April 18, 2017.

Credit Hours: 4 hours
Departmental Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

Credit Hours: 3 hours
This course is restricted to Mathematics and Math&CS majors initially, but the restriction will be removed on April 14, 2017 at 1pm.
<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
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</tr>
<tr>
<td>39127</td>
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<td>B14</td>
<td>09:00 AM - 09:50 AM</td>
<td>MWF</td>
<td>445 - Altgeld Hall</td>
<td>Hirani, A</td>
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</table>

Credit Hours: 3 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

MATH 424  **Honors Real Analysis**  credit: 3 hours.
A rigorous treatment of basic real analysis via metric spaces recommended for those who intend to pursue programs heavily dependent upon graduate level Mathematics. Metric space topics include continuity, compactness, completeness, connectedness and uniform convergence. Analysis topics include the theory of differentiation, Riemann-Darboux integration, sequences and series of functions, and interchange of limiting operations. As part of the honors sequence, this course will be rigorous and abstract. 3 undergraduate hours. No graduate credit. Credit is not given for both Math 424 and either Math 444 or Math 447. Approved for honors grading. Prerequisite: An honors section of MATH 347 or an honors section of MATH 416, and consent of the department.
MATH 427  **Honors Abstract Algebra**  credit: 3 hours.
Group theory, counting formulae, factorization, modules with applications to Abelian groups and linear operators. As part of the honors sequence, this course will be rigorous and abstract. 3 undergraduate hours. No graduate credit. Approved for honors grading. Credit is not given for both MATH 427 and MATH 417. Prerequisite: Consent of the department is required. Prerequisite courses are either an honors section of MATH 416, or MATH 415 together with an honors section of MATH 347.

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<tr>
<th>CRN</th>
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<tr>
<td>49850</td>
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<td>MWF</td>
<td>343 - Altgeld Hall</td>
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</table>

Departmental Approval Required
Restricted to Undergrad - Urbana-Champaign.
Students interested in joining this Math Honors Sequence course should contact mathadvising@illinois.edu with name, 9-digit UIN, and reason for wishing to join. Excellent prior math grades are expected.

MATH 428  **Honors Topics in Mathematics**  credit: 3 hours.
A capstone course in the Mathematics Honors Sequences. Topics will vary. As part of the honors sequence, this course will be rigorous and abstract. 3 undergraduate hours. No graduate credit. May be repeated in the same or separate terms to a maximum of 12 hours. Prerequisite: Consent of the department.

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<td>47762</td>
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</table>

Departmental Approval Required
Restricted to Undergrad - Urbana-Champaign.
The Stern sequence is an object in combinatorial number theory which has an astounding variety of interesting properties and applications in many areas of mathematics. In this course, we will emulate Ravel's "Bolero" and gradually introduce mathematical tools of general utility, allowing us to prove ever-increasing types of Stern properties. To be more specific, the topics covered in Fall 2017 will include the ring of formal power series, basic asymptotics, modular arithmetic and the Euler phi function, continuous strictly increasing functions with 0 derivative a.e, Markov chains and a surprising amount of linear algebra. Course will incorporate some computation as well. Students who have been successful in Math 424, Math 427, or earned A to A+ grades in Math 413, 417, 447, 448 or 453 may contact mathadvising@illinois.edu with name, netid, UIN, and request for approval to add Math 428.

MATH 439  **Philosophy of Mathematics**  credit: 3 OR 4 hours.
Same as PHIL 439. See PHIL 439.

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<td>Gilbert, D</td>
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</table>

Credit Hours: 4 hours
MATH 441  **Differential Equations**  credit: 3 OR 4 hours.
Basic course in ordinary differential equations; topics include existence and uniqueness of solutions and the general theory of linear
differential equations; treatment is more rigorous than that given in MATH 285. 3 or 4 undergraduate hours. 3 or 4 graduate hours.
Credit is not given for both MATH 441 and any of MATH 284, MATH 285, MATH 286. 4 hours of credit requires approval of the
instructor and completion of additional work of substance. Prerequisite: MATH 241; MATH 347 or MATH 348 is recommended.

MATH 442  **Intro Partial Diff Equations**  credit: 3 OR 4 hours.
Introduces partial differential equations, emphasizing the wave, diffusion and potential (Laplace) equations. Focuses on understanding
the physical meaning and mathematical properties of solutions of partial differential equations. Includes fundamental solutions and
transform methods for problems on the line, as well as separation of variables using orthogonal series for problems in regions with
boundary. Covers convergence of Fourier series in detail. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires
approval of the instructor and completion of additional work of substance. Prerequisite: One of MATH 284, MATH 285, MATH 286,
MATH 441.
MATH 444  Elementary Real Analysis  credit: 3 OR 4 hours.

Careful treatment of the theoretical aspects of the calculus of functions of a real variable intended for those who do not plan to take graduate courses in Mathematics. Topics include the real number system, limits, continuity, derivatives, and the Riemann integral. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 444 and either Math 424 or MATH 447. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; MATH 347 or MATH 348, or equivalent.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

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</table>

Credit Hours: 3 hours
This course is restricted to Mathematics, Math&CS, and Stat&CS majors initially, but the restriction will be removed during business hours on April 18, 2017. Current Statistics majors may consult with the Statistics advisor to determine whether they are eligible for an override before the restriction-remove date.

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<th>CRN</th>
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<th>Time</th>
<th>Days</th>
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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

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<td>303 - English Building</td>
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Credit Hours: 3 hours
This course is restricted to Mathematics, Math&CS, and Stat&CS majors initially, but the restriction will be removed during business hours on April 18, 2017. Current Statistics majors may consult with the Statistics advisor to determine whether they are eligible for an override before the restriction-remove date.

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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

**MATH 446 Applied Complex Variables**  credit: 3 OR 4 hours.

For students who desire a working knowledge of complex variables; covers the standard topics and gives an introduction to integration by residues, the argument principle, conformal maps, and potential fields. Students desiring a systematic development of the foundations of the subject should take MATH 448. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 446 and MATH 448. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241.

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Credit Hours: 3 hours

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<td>59650</td>
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</table>

Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

MATH 447  Real Variables credit: 3 OR 4 hours.
Careful development of elementary real analysis for those who intend to take graduate courses in Mathematics. Topics include completeness property of the real number system; basic topological properties of n-dimensional space; convergence of numerical sequences and series of functions; properties of continuous functions; and basic theorems concerning differentiation and Riemann integration. 3 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 447 and either Math 424 or MATH 444. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Prerequisite: MATH 241 or equivalent; junior standing; MATH 347 or MATH 348, or equivalent experience; or consent of instructor.

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Credit Hours: 3 hours
Class is restricted to Mathematics until business hours on the morning of April 17, 2017.

<table>
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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

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Credit Hours: 3 hours
Class is restricted to Mathematics until business hours on the morning of April 17, 2017.

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<td>32139</td>
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<td>D14</td>
<td>11:00 AM - 11:50 AM</td>
<td>MWF</td>
<td>445 - Altgeld Hall</td>
<td>Erdogan, M</td>
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</table>

Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

MATH 448  Complex Variables credit: 3 OR 4 hours.
For students who desire a rigorous introduction to the theory of functions of a complex variable; topics include Cauchy's theorem, the residue theorem, the maximum modulus theorem, Laurent series, the fundamental theorem of algebra, and the argument principle. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 448 and MATH 446. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 447.

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<td>Wu, J</td>
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</table>

Credit Hours: 3 hours
MATH 450  **Numerical Analysis**  credit: 0 to 4 hours.
Same as CS 450, CSE 401 and ECE 491. See CS 450.

<table>
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<th>Location</th>
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<tbody>
<tr>
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<td>BL1</td>
<td>03:30 PM - 04:45 PM</td>
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<td>1320 - Digital Computer Laboratory</td>
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<tr>
<td>36042</td>
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<td>03:30 PM - 04:45 PM</td>
<td>MW</td>
<td>1320 - Digital Computer Laboratory</td>
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</table>
|        | Credit Hours: 4 hours
|        | Restricted to Graduate - Urbana-Champaign |

MATH 453  **Elementary Theory of Numbers**  credit: 3 OR 4 hours.
Basic introduction to the theory of numbers. Core topics include divisibility, primes and factorization, congruences, arithmetic functions, quadratic residues and quadratic reciprocity, primitive roots and orders. Additional topics covered at the discretion of the instructor include sums of squares, Diophantine equations, continued fractions, Farey fractions, recurrences, and applications to primality testing and cryptography. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241 or equivalent.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

<table>
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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>32140</td>
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<td>G13</td>
<td>03:00 PM - 03:50 PM</td>
<td>MWF</td>
<td>241 - Altgeld Hall</td>
<td>Ford, K</td>
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|        | Credit Hours: 3 hours
|        | Quantitative Reasoning II course. |
| 32144  | Lecture-Discussion  | G14     | 03:00 PM - 03:50 PM | MWF  | 241 - Altgeld Hall | Ford, K    |
|        | Credit Hours: 4 hours
|        | Quantitative Reasoning II course.  
|        | Instructor Approval Required
|        | Restricted to Graduate - Urbana-Champaign. 
|        | Instructor approval forms available in 313 Altgeld Hall beginning on the first day of Fall semester. |
| 32147  | Lecture-Discussion  | M13     | 09:30 AM - 10:50 AM | TR   | 447 - Altgeld Hall | Zaharescu, A |
Credit Hours: 3 hours
Quantitative Reasoning II course.

<table>
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Credit Hours: 4 hours
Quantitative Reasoning II course.
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

MATH 461  **Probability Theory**  credit: 3 OR 4 hours.
Introduction to mathematical probability; includes the calculus of probability, combinatorial analysis, random variables, expectation, distribution functions, moment-generating functions, and central limit theorem. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both MATH 461 and either MATH 408 or ECE 313. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241 or equivalent.

<table>
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<tr>
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Credit Hours: 3 hours
Restricted to MS: Civil Engr - Online - UIUC, MCS:Computer Sci Online -UIUC, MS:Mechanical Engineering -UIUC, MS: Aerospace Engr-Online-UIUC, or MENG:Mech Engineering Onl-UIUC.
Restricted to online MCS, online MSME, online MSAE and online MSCE students only. Online non-degree and campus undergraduates are not eligible to register for this section. For more details on this course section, please see [http://engineering.illinois.edu/online/courses/](http://engineering.illinois.edu/online/courses/). This section is restricted to Engineering online graduate degree-seeking students only. Non-degree students please register for MATH 461 M16 section.

<table>
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Credit Hours: 3 hours

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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

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Credit Hours: 3 hours

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MATH 463  **Statistics and Probability I**  credit: 4 hours.

Same as STAT 400. See STAT 400.

Students must register for one discussion and one lecture section.

<table>
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<th>Location</th>
<th>Instructor</th>
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<td>33413</td>
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<td>AD1</td>
<td>01:00 PM - 01:50 PM</td>
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<td>386 - Armory</td>
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<tr>
<td>49240</td>
<td>Discussion/Recitation</td>
<td>AD2</td>
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<tr>
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For up-to-date information about statistics course registration, please see our registration update pages: go.illinois.edu/StatisticsRegistration

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Credit Hours: 4 hours
Restricted to Graduate - Urbana-Champaign.

For up-to-date information about statistics course registration, please see our registration update pages: go.illinois.edu/StatisticsRegistration
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**MATH 469  Methods of Applied Statistics**  
credit: 3 OR 4 hours.  
Same as STAT 420. See STAT 420.

<table>
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Credit Hours: 4 hours  
Restricted to Graduate - Urbana-Champaign.  
For up-to-date information about statistics course registration, please see our registration update pages: go.illinois.edu/StatisticsRegistration

<table>
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Credit Hours: 3 hours  
Restricted to Undergrad - Urbana-Champaign.
For up-to-date information about statistics course registration, please see our registration update pages: go.illinois.edu/StatisticsRegistration

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<td>4GR</td>
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<td>Culpepper, S</td>
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</table>

MATH 471  Life Contingencies I  credit: 4 hours.
Distribution of the time-to-death random variable for a single life, and its implications for evaluations of insurance and annuity functions, net premiums, and reserves. 4 undergraduate hours. 4 graduate hours. Prerequisite: MATH 408 and MATH 210.
Students must register for one discussion and one lecture section.
MATH 475  Formal Models of Computation  credit: 3 OR 4 hours.
Same as CS 475. See CS 475.

<table>
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<tr>
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Credit Hours: 3 hours
Restricted to Engineering.

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<th>Time</th>
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<td>1302 - Siebel Center for Comp Sci</td>
<td>Viswanathan, M</td>
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</tbody>
</table>

Credit Hours: 4 hours
Restricted to Graduate College. Restricted to Graduate - Urbana-Champaign.

MATH 476  Investments and Financial Markets  credit: 3 hours.
Theoretical foundation in financial models and their applications to insurance and other financial risks. Topics include derivative markets, no arbitrage pricing of financial derivatives, interest rate models, dynamic hedging and other risk management techniques. 3 undergraduate hours. No graduate credit. Credit is not given for MATH 476 and MATH 567. Prerequisite: Credit or concurrent registration in STAT 409 or STAT 410.

<table>
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<tr>
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<th>Time</th>
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<td>Wang, J</td>
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Restricted to Actuarial Science major(s). Restricted to Undergrad - Urbana-Champaign.

MATH 479  Casualty Actuarial Mathematics  credit: 3 OR 4 hours.
An introduction to property/casualty actuarial science, exploring its mathematical financial, and risk-theoretical foundations. Specific topics include risk theory, loss reserving, ratemaking, risk classification, credibility theory, reinsurance, financial pricing of insurance, and other special issues and applications. 3 or 4 undergraduate hours. No graduate credit. Credit is not given for MATH 479 and MATH 569. Prerequisite: MATH 210; credit or concurrent registration in MATH 409; or consent of instructor.

<table>
<thead>
<tr>
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<td>MW</td>
<td>156 - Henry Administration Bldg</td>
<td>Buysse, K</td>
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</table>
MATH 482  Linear Programming  credit: 3 OR 4 hours.

Rigorous introduction to a wide range of topics in optimization, including a thorough treatment of basic ideas of linear programming, with additional topics drawn from numerical considerations, linear complementarity, integer programming and networks, polyhedral methods. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 410, MATH 415, or MATH 416.

<table>
<thead>
<tr>
<th>CRN</th>
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Credit Hours: 3 hours
This course is restricted to Mathematics majors initially, but the restriction will be removed during business hours on April 18, 2017.

<table>
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<th>CRN</th>
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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

<table>
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<th>CRN</th>
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Credit Hours: 3 hours
This course is restricted to Mathematics majors initially, but the restriction will be removed during business hours on April 18, 2017.

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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester.

MATH 484  Nonlinear Programming  credit: 3 OR 4 hours.

Iterative and analytical solutions of constrained and unconstrained problems of optimization; gradient and conjugate gradient solution methods; Newton's method, Lagrange multipliers, duality and the Kuhn-Tucker theorem; and quadratic, convex, and geometric programming. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; MATH 347 or MATH 348; or equivalent; MATH 415 or equivalent; or consent of instructor.

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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>30809</td>
<td>Lecture-Discussion</td>
<td>F13</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>241 - Altgeld Hall</td>
<td>Lavrov, M</td>
</tr>
</tbody>
</table>

Credit Hours: 3 hours
This course is restricted to Mathematics and Math&CS majors initially, but the restriction will be removed during business hours on April 14, 2017 by 1pm.
MATH 487  **Advanced Engineering Math**  credit: 3 OR 4 hours.
Complex linear algebra, inner product spaces, Fourier transforms and analysis of boundary value problems, Sturm-Liouville theory. Same as ECE 493. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: One of MATH 284, MATH 285, MATH 286, MATH 441.

<table>
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<tr>
<th>CRN</th>
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<th>Section</th>
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<tr>
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Credit Hours: 3 hours

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<th>Type</th>
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<th>Time</th>
<th>Days</th>
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<th>Instructor</th>
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<tr>
<td>69829</td>
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<td>MWF</td>
<td>241 - Altgeld Hall</td>
<td>D'Angelo, J</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Departmental Approval Required

MATH 489  **Dynamics & Differential Eqns**  credit: 3 OR 4 hours.
Studies mathematical theory of dynamical systems, emphasizing both discrete-time dynamics and nonlinear systems of differential equations. Topics include: chaos, fractals, attractors, bifurcations, with application to areas such as population biology, fluid dynamics and classical physics. Basic knowledge of matrix theory will be assumed. 3 or 4 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Prerequisite: One of MATH 284, MATH 285, MATH 286, MATH 441.

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<tr>
<th>CRN</th>
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Credit Hours: 3 hours

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<tr>
<th>CRN</th>
<th>Type</th>
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<th>Time</th>
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<tr>
<td>39141</td>
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<td>B14</td>
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<td>341 - Altgeld Hall</td>
<td>La Nave, G</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
Departmental approval forms will be available in 313 Altgeld Hall beginning on the first day of the semester until the 8th week of the semester

MATH 492  **Undergraduate Research in Math**  credit: 1 TO 3 hours.
Work closely with department faculty on a well-defined research project. Topics and nature of assistance vary. Capstone paper or computational project required. 1 to 3 undergraduate hours. No graduate credit. Approved for Letter and S/U grading. May be repeated in separate terms up to 8 hours. Prerequisite: Evidence of adequate preparation for such study; consent of faculty member supervising the work; and approval of the department head.
## MATH 499  Introduction Graduate Research  credit: 1 hours.
Seminar is required of all first-year graduate students in Mathematics. It provides a general introduction to the courses and research work in all of the areas of mathematics that are represented at the University of Illinois at Urbana-Champaign. 1 undergraduate hour. 1 graduate hour. Approved for S/U grading only. May be repeated to a maximum of 2 hours. Prerequisite: Graduate standing or consent of instructor.
This course must be taken by all first year graduate students in the department of mathematics.

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<tr>
<th>CRN</th>
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<th>Time</th>
<th>Days</th>
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<tr>
<td>64054</td>
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<td>04:00 PM - 04:50 PM</td>
<td>M</td>
<td>245 - Altgeld Hall</td>
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</table>

## MATH 500  Abstract Algebra I  credit: 4 hours.

<table>
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<th>CRN</th>
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<td>30815</td>
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<td>10:00 AM - 10:50 AM</td>
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<td>106B8 - Engineering Hall</td>
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</table>


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## MATH 502  Commutative Algebra  credit: 4 hours.
Commutative rings and modules, prime ideals, localization, noetherian rings, primary decomposition, integral extensions and Noether normalization, the Nullstellensatz, dimension, flatness, Hensel's lemma, graded rings, Hilbert polynomial, valuations, regular rings, singularities, unique factorization, homological dimension, depth, completion. Possible further topics: smooth and etale extensions, ramification, Cohen-Macaulay modules, complete intersections. Prerequisite: MATH 501 or consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
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<th>Time</th>
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<td>12:30 PM - 01:50 PM</td>
<td>TR</td>
<td>341 - Altgeld Hall</td>
<td>Dutta, S</td>
</tr>
</tbody>
</table>
MATH 510  **Riemann Surf & Algebraic Curv**  credit: 4 hours.

An introduction to Riemann Surfaces from both the algebraic and function-theoretic points of view. Topics include holomorphic and meromorphic differential forms, integration of differential forms, divisors and linear equivalence, the genus of a compact Riemann surface, projective algebraic curves, the Riemann-Roch theorem, and applications. Prerequisite: MATH 542.

<table>
<thead>
<tr>
<th>CRN</th>
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<td>MWF</td>
<td>445 - Altgeld Hall</td>
<td>Dodd, C</td>
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</tbody>
</table>

MATH 512  **Modern Algebraic Geometry**  credit: 4 hours.

An introduction to the tools and ideas of contemporary algebraic geometry, with particular focus on the language of schemes. 4 graduate hours. No professional credit. Prerequisite: MATH 500, and one of MATH 510, MATH 511, or consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
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MATH 518  **Differentiable Manifolds I**  credit: 4 hours.

Definitions and properties of differentiable manifolds and maps, (co)tangent bundles, vector fields and flows, Frobenius theorem, differential forms, exterior derivatives, integration and Stokes' theorem, DeRham cohomology, inverse function theorem, Sard's theorem, transversality and intersection theory. Prerequisite: MATH 423 or MATH 481, or consent of instructor.

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<thead>
<tr>
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<td>MWF</td>
<td>143 - Altgeld Hall</td>
<td>Kerman, E</td>
</tr>
</tbody>
</table>
MATH 526  **Algebraic Topology II**  credit: 4 hours.

CW-complexes, relative homeomorphism theorem, cellular homology, cohomology, Kunneth theorem, Eilenberg-Zilber theorem, cup products, Poincare duality, examples. Prerequisite: MATH 525, MATH 500; or consent of instructor. MATH 501 is recommended but not required.

<table>
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<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
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<th>Instructor</th>
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<tr>
<td>59521</td>
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</tbody>
</table>


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MATH 527  **Homotopy Theory**  credit: 4 hours.

Homotopy groups, fibrations and cofibrations, Hurewicz theorem, obstruction theory, Whitehead theorem and additional topics perhaps drawn from Postnikov towers, Freudenthal suspension theorem, Blakers-Massey theorem, spectra. Prerequisite: MATH 526. MATH 501 is recommended but not required.

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<tr>
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<th>Days</th>
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<th>Instructor</th>
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<td>TR</td>
<td>441 - Altgeld Hall</td>
<td>Rezk, C</td>
</tr>
</tbody>
</table>


MATH 531  **Analytic Theory of Numbers I**  credit: 4 hours.

Problems in number theory treated by methods of analysis: arithmetic functions, Dirichlet series, Riemann zeta function, L-functions, Dirichlet's theorem on primes in progressions, the prime number theorem. Prerequisite: MATH 448 and either MATH 417 or MATH 453.

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<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tr>
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<td>145 - Altgeld Hall</td>
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MATH 535  **General Topology**  credit: 4 hours.
Study of topological spaces and maps, including Cartesian products, identifications, connectedness, compactness, uniform spaces, and function spaces. Prerequisite: Consent of instructor.

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<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
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<tr>
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MATH 540  **Real Analysis**  credit: 4 hours.
Lebesgue measure on the real line; integration and differentiation of real valued functions of a real variable; and additional topics at discretion of instructor. Prerequisite: MATH 447 or equivalent.

<table>
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<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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MATH 542  **Complex Variables I**  credit: 4 hours.
Topics include the Cauchy theory, harmonic functions, entire and meromorphic functions, and the Riemann mapping theorem. Prerequisite: MATH 446 and MATH 447, or MATH 448.

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MATH 547  **Banach Spaces**  credit: 4 hours.
Basic properties and fundamental theorems of Banach spaces and bounded linear maps, trace duality, absolutely summing maps, local theory, type and cotype, probabilistic techniques in Banach spaces, and further topics depending on the instructor. 4 graduate hours. No professional credit. Prerequisite: MATH 541.

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<tr>
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<td>MWF</td>
<td>447 - Altgeld Hall</td>
<td>Oikhberg, T</td>
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</table>


MATH 550  **Dynamical Systems I**  credit: 4 hours.

An introduction to the study of dynamical systems. Considers continuous and discrete dynamical systems at a sophisticated level: differential equations, flows and maps on Euclidean space and other manifolds. Emphasis will be placed on the fundamental theoretical concepts and the interaction between the geometry and topology of manifolds and global flows. Discrete dynamics includes Bernoulli shifts, elementary Anosov diffeomorphisms and surfaces of sections of flows. Bifurcation phenomena in both continuous and discrete dynamics will be studied. Prerequisite: MATH 489 or consent of instructor.

<table>
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MATH 553  **Partial Differential Equations**  credit: 4 hours.

Basic introduction to the study of partial differential equations; topics include: the Cauchy problem, power-series methods, characteristics, classification, canonical forms, well-posed problems, Riemann's method for hyperbolic equations, the Goursat problem, the wave equation, Sturm-Liouville problems and separation of variables, Fourier series, the heat equation, integral transforms, Laplace's equation, harmonic functions, potential theory, the Dirichlet and Neumann problems, and Green's functions. Prerequisite: Consent of instructor.

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<tr>
<th>CRN</th>
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<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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MATH 554  **Linear Analysis and Partial Differential Equations**  credit: 4 hours.
Course will provide students with the basic background in linear analysis associated with partial differential equations. The specific topics chosen will be largely up to the instructor, but will cover such areas as linear partial differential operators, distribution theory and test functions, Fourier transforms, Sobolev spaces, pseudodifferential operators, microlocal analysis, and applications of the above topics. 4 graduate hours. No professional credit. Prerequisite: MATH 447, MATH 489 or consent of instructor.

<table>
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<tr>
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<td>09:30 AM - 10:50 AM</td>
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<td>7 - Illini Hall</td>
<td>Hur, M</td>
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</table>


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MATH 562  **Theory of Probability II**  credit: 4 hours.

Continuation of MATH 561. Same as STAT 552. Prerequisite: MATH 561.

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<td>447 - Altgeld Hall</td>
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MATH 563  **Risk Modeling and Analysis**  credit: 4 hours.

Quantitative tools for measuring risks and modeling dependencies. Topics include risk measures, stochastic orders, copulas, dependence measures, and their statistical inferences. Same as STAT 558. 4 graduate hours. No professional credit. Prerequisite: MATH 408 or MATH 461.

<table>
<thead>
<tr>
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<td>TR</td>
<td>441 - Altgeld Hall</td>
<td>Feng, R</td>
</tr>
</tbody>
</table>


MATH 564  **Applied Stochastic Processes**  credit: 4 hours.

Introduction to topics such as spectral analysis, filtering theory, and prediction theory of stationary processes; Markov chains and Markov processes. Same as STAT 555. Prerequisite: MATH 446 and MATH 447.
<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>49163</td>
<td>Lecture-Discussion</td>
<td>P13</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>152 - Henry Administration Bldg</td>
<td>Wang, J</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Restricted to Graduate - Urbana-Champaign. Restricted to MS:Economics:Policy Econ - UIUC, MS:App Mth-Actuarial Sci - UIUC, or MS:Economics:Policy Econ - UIUC.
Undergraduate students may register with approval. For more information go to room 313 AH. Students from the following programs must contact the Director of Graduate Studies in Mathematics <Laugesen@illinois.edu> to request permission to register for the course: Restricted to Graduate - Urbana-Champaign. Not intended for MS:Economics:Policy Econ - UIUC, MS:Economics:Policy Econ - UIUC, MS: Financial Engineering, MENG: Mechanical Engineering-UIUC, MENG: Elec & Computer Eng-UIUC, or MENG: Engineering: Comp Eng-UIUC

MATH 569  Casualty Actuarial Science  credit: 4 hours.
Principles and fundamental techniques of ratemaking for casualty and property insurances; risk classification; coinsurance; estimation of claim liabilities; financial reporting; catastrophe modeling. 4 graduate hours. No professional credit. Credit is not given for MATH 479 and MATH 569. Prerequisite: Math 408.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>67683</td>
<td>Lecture-Discussion</td>
<td>G1</td>
<td>03:00 PM - 04:20 PM</td>
<td>MW</td>
<td>156 - Henry Administration Bldg</td>
<td>Buysse, K</td>
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MATH 570  Mathematical Logic  credit: 4 hours.
Development of first order predicate logic; completeness theorem; formalized number theory and the Godel incompleteness theorem. Prerequisite: MATH 417 or consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>30831</td>
<td>Lecture-Discussion</td>
<td>X1</td>
<td>02:00 PM - 03:20 PM</td>
<td>TR</td>
<td>443 - Altgeld Hall</td>
<td>Tserunyan, A</td>
</tr>
</tbody>
</table>
MATH 580  **Combinatorial Mathematics**  credit: 4 hours.
Fundamental results on core topics of combinatorial mathematics: classical enumeration, basic graph theory, extremal problems on finite sets, probabilistic methods, design theory, discrete optimization. Same as CS 571. Prerequisite: Consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>33562</td>
<td>Lecture-Discussion</td>
<td>D1</td>
<td>12:00 PM - 12:50 PM</td>
<td>MWF</td>
<td>343 - Altgeld Hall</td>
<td>Balog, J</td>
</tr>
</tbody>
</table>

MATH 585  **Probabilistic Combinatorics**  credit: 4 hours.
Techniques and applications of probabilistic methods in combinatorics. Draws applications from a variety of areas, but emphasizes theoretical aspects of random graphs, including connectivity, trees & cycles, planarity, and coloring problems. Techniques include the second moment method, Lovasz Local Lemma, martingales, Talgrand’s Inequality, the Rodl Nibble, and Szemeredi’s Regularity Lemma. Applications may come from discrete geometry, coding theory, algorithms & complexity, additive number theory, percolation, positional games, etc. Prerequisite: MATH 580 or consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>58366</td>
<td>Lecture-Discussion</td>
<td>C1</td>
<td>10:00 AM - 10:50 AM</td>
<td>MWF</td>
<td>447 - Altgeld Hall</td>
<td>Balog, J</td>
</tr>
</tbody>
</table>

MATH 593  **Mathematical Internship**  credit: 0 hours.
Full-time or part-time practice of graduate-level mathematics in an off-campus government, industrial, or research laboratory environment. Summary report required. 0 graduate credit. No professional credit. Approved for S/U grading only. May be repeated in separate terms.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>65165</td>
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<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>65166</td>
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<td>-</td>
<td>Mortensen, K</td>
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</tr>
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</table>

Instructor Approval Required

MATH 595 Advanced Topics in Mathematics credit: 1 TO 4 hours.
See Class Schedule for current topics. 1 to 4 graduate hours. No professional credit. May be repeated in the same or separate semesters. Prerequisite: Consent of instructor.

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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>64464</td>
<td>Lecture-Discussion</td>
<td>AIR</td>
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<td>347 - Altgeld Hall</td>
<td>Ford, K</td>
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</table>

Credit Hours: 4 hours
Anatomy of Integers

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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>42963</td>
<td>Lecture-Discussion</td>
<td>EC</td>
<td>02:00 PM - 02:50 PM</td>
<td>MWF</td>
<td>141 - Altgeld Hall</td>
<td>Duursma, I</td>
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Credit Hours: 2 hours
Elliptic Curves
Restricted to Graduate - Urbana-Champaign. Not intended for MS:Economics:Policy Econ -UIUC or MS:Economics:Policy Econ -UIUC.
Meets 28-Aug-17 - 20-Oct-17.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
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<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>58570</td>
<td>Lecture-Discussion</td>
<td>HAK</td>
<td>09:30 AM - 10:50 AM</td>
<td>R</td>
<td>347 - Altgeld Hall</td>
<td>Heller, J</td>
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</table>

Credit Hours: 2 hours
Higher Algebraic K-Theory

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
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<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>62754</td>
<td>Lecture-Discussion</td>
<td>QIT</td>
<td>12:30 PM - 01:50 PM</td>
<td>TR</td>
<td>7 - Illini Hall</td>
<td>Junge, M</td>
</tr>
</tbody>
</table>

Credit Hours: 2 hours
Quantum Information Theory
Meets 23-Oct-17 - 13-Dec-17.
Topic: Operator Algebra methods in Quantum Information Theory. See http://www.math.uiuc.edu/timetable/ for the full course description. Students from the following programs must contact the Director of Graduate Studies in Mathematics <Laugesen@illinois.edu> to request permission to register for the course: MS:Economics:Policy Econ -UIUC or MS: Financial Engineering.

<table>
<thead>
<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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</thead>
<tbody>
<tr>
<td>48012</td>
<td>Lecture-Discussion</td>
<td>TF</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>445 - Altgeld Hall</td>
<td>Tyson, J</td>
</tr>
</tbody>
</table>

Credit Hours: 2 hours
Tube Formulas
Not intended for MS:Economics:Policy Econ -UIUC or MS:Economics:Policy Econ -UIUC.
Meets 23-Oct-17 - 13-Dec-17.

MATH 597 **Reading Course**  credit: 1 TO 8 hours.
Independent study in Mathematics. 1 to 8 graduate hours. No professional credit. Approved for Letter and S/U grading. May be repeated in the same or separate terms, with a maximum of 8 hours per semester. Prerequisite: Consent of instructor.

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<tr>
<th>CRN</th>
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<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
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<tbody>
<tr>
<td>10556</td>
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<td>ARRANGED -</td>
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</tbody>
</table>

Instructor Approval Required
Instructor Approval Required. Undergraduate students may register with approval. For more information go to room 313 AH.

MATH 598 **Literature Seminar in Math**  credit: 0 TO 4 hours.
Seminar on topics of current interest in mathematics. Students present seminars and discussions on various topics. See Class Schedule for current topics. Recommended for all Mathematics students. 0 to 4 graduate hours. No professional credit. Approved for Letter and S/U grading. May be repeated in the same or separate semesters as topics vary. Prerequisite: Consent of instructor.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>60303</td>
<td>Lecture-Discussion</td>
<td>OA</td>
<td>05:00 PM - 06:20 PM</td>
<td>M</td>
<td>343 - Altgeld Hall</td>
<td>Junge, M</td>
</tr>
</tbody>
</table>

Credit Hours: 1 hours
Operator Algebras
Topic: Operator Algebras. See http://www.math.uiuc.edu/timetable/ for the full course description. Students from the following programs must contact the Director of Graduate Studies in Mathematics <Laugesen@illinois.edu> to request permission to register for the course: Restricted to Graduate - Urbana-Champaign. Not intended for MS:Economics:Policy Econ -UIUC, MS:Economics:Policy Econ -UIUC, MS: Financial Engineering, MENG:Mechanical Engineering:UIUC, MENG:Elec & Computer Eng:UIUC, or MENG:Engineering:Comp Eng:UIUC

MATH 599 **Thesis Research**  credit: 0 TO 16 hours.
Approved for S/U grading only. May be repeated. Prerequisite: Consent of instructor.
<table>
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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
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<tbody>
<tr>
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</table>

Departmental Approval Required