BACHELOR OF SCIENCE IN MATHEMATICS

Why study mathematics?
Because mathematics is a framework upon which humanity builds an understanding of the world.

Mathematics Programs
Separate programs lead to the B.A. in mathematics and the B.S. in mathematics. The B.A. has fewer mathematics course requirements and more general education requirements. The B.S. requires more mathematics courses, an applied mathematics concentration, and fewer general education courses. Students wishing to attend graduate school in mathematics or to pursue a career that makes substantial use of mathematics (as an actuary, for example) should get a B.S. in mathematics. Many students majoring in mathematics are interested in a liberal arts degree; such students may want to consider the B.A. in mathematics. Students who wish to teach mathematics in high school should pursue a B.A. or B.S. in mathematics while participating in the UKanTeach program (http://ukanteach.ku.edu).

Requirements for the B.S. Degree
First- and Second-Year Preparation (17)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 125</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 145</td>
<td>Calculus I, Honors</td>
<td>4</td>
</tr>
<tr>
<td>MATH 126</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 146</td>
<td>Calculus II, Honors</td>
<td>4</td>
</tr>
<tr>
<td>MATH 127</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 147</td>
<td>Calculus III, Honors</td>
<td>4</td>
</tr>
<tr>
<td>MATH 290</td>
<td>Elementary Linear Algebra</td>
<td>2</td>
</tr>
<tr>
<td>or MATH 291</td>
<td>Elementary Linear Algebra, Honors</td>
<td>2</td>
</tr>
</tbody>
</table>

Select one of the following: 3

- MATH 320 Elementary Differential Equations
- MATH 220 Applied Differential Equations
- MATH 221 Applied Differential Equations, Honors

Core Requirements (12)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 590</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 790</td>
<td>Linear Algebra II</td>
<td></td>
</tr>
<tr>
<td>MATH 500</td>
<td>Intermediate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 765</td>
<td>Mathematical Analysis I</td>
<td></td>
</tr>
<tr>
<td>MATH 558</td>
<td>Introductory Modern Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 791</td>
<td>Modern Algebra</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 3

- MATH 526 Applied Mathematical Statistics I
- MATH 628 Mathematical Theory of Statistics
- MATH 728 Statistical Theory

Mathematics Concentration/Sequence Requirements (6-12)

Select one 2-course sequence from List A and a second 2-course sequence from either List A or List B

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 500</td>
<td>Intermediate Analysis</td>
<td>6</td>
</tr>
<tr>
<td>&amp; MATH 646</td>
<td>and Complex Variable and Applications</td>
<td>6</td>
</tr>
<tr>
<td>MATH 526</td>
<td>Applied Mathematical Statistics I</td>
<td>6</td>
</tr>
<tr>
<td>&amp; MATH 605</td>
<td>and Applied Regression Analysis</td>
<td>6</td>
</tr>
<tr>
<td>MATH 526</td>
<td>Applied Mathematical Statistics I</td>
<td>6</td>
</tr>
<tr>
<td>&amp; MATH 611</td>
<td>and Time Series Analysis</td>
<td>6</td>
</tr>
</tbody>
</table>

List A Sequences

- MATH 627 Probability
- MATH 628 and Mathematical Theory of Statistics
- MATH 660 Geometry I
- MATH 661 and Geometry II
- MATH 727 Probability Theory
- MATH 728 and Statistical Theory
- MATH 765 Mathematical Analysis I
- MATH 766 and Mathematical Analysis II
- MATH 781 Numerical Analysis I
- MATH 782 and Numerical Analysis II
- MATH 790 Linear Algebra II
- MATH 791 and Modern Algebra

List B Sequences

- MATH 500 Intermediate Analysis
- MATH 646 and Complex Variable and Applications
- MATH 526 Applied Mathematical Statistics I
- MATH 605 and Applied Regression Analysis
- MATH 526 Applied Mathematical Statistics I
- MATH 611 and Time Series Analysis
List C Applied Concentration Courses

Statistics (15)

MATH 605 Applied Regression Analysis 3
MATH 611 Time Series Analysis 3
MATH 624 Discrete Probability 3
ECON 817 Econometrics I 3
ECON 818 Econometrics II 3

Economics and Finance (42)

ECON 526 Introduction to Econometrics 3
ECON 590 Game Theory 3
ECON 620 Elements of Mathematical Economics 3
ECON 700 Survey of Microeconomics 3
ECON 701 Survey of Macroeconomics 3
ECON 715 Elementary Econometrics 3
ECON 716 Econometric Forecasting 3
FIN 310 Finance 3
FIN 410 Investment Theory and Applications 3
FIN 415 Corporate Finance 3
FIN 420 International Finance 3
FIN 425 Futures and Options 3
MATH 630 Actuarial Mathematics 3
SCM 310 Management Science and Operations Management 3

Biology (21)

BIOL 350 Principles of Genetics 4
BIOL 412 Evolutionary Biology 4
BINF 701 Bioinformatics I 5
BINF 702 Bioinformatics II 5

Physics and Astronomy (42)

PHSX 313 General Physics III 3
PHSX 511 Introductory Quantum Mechanics 3
PHSX 518 Mathematical Physics 3
PHSX 521 Mechanics I 3
PHSX 531 Electricity and Magnetism 3
ASTR 591 Stellar Astronomy 3
ASTR 592 Galactic and Extragalactic Astronomy 3
PHSX 621 Mechanics II 3
PHSX 631 Electromagnetic Theory 3
PHSX 655 Optics 3
PHSX 671 Thermal Physics 3
PHSX 691 Astrophysics I 3
PHSX 711 Quantum Mechanics I 3
PHSX 741 Nuclear Physics I 3

Chemistry (10)

CHEM 530 Physical Chemistry I 3
CHEM 535 Physical Chemistry II 4
CHEM 620 Analytical Chemistry 3

Aerospace Engineering (28)

AE 345 Fluid Mechanics 3
AE 445 Aircraft Aerodynamics and Performance 3
AE 507 Aerospace Structures I 3
AE 545 Fundamentals of Aerodynamics 4
AE 550 Dynamics of Flight I 4
AE 551 Dynamics of Flight II 4
AE 552 Honors Dynamics of Flight II 4
AE 750 Applied Optimal Control 3

Chemical and Petroleum Engineering (13)

C&PE 211 Material and Energy Balances 3
C&PE 511 Momentum Transfer 3
C&PE 521 Heat Transfer 3
C&PE 523 Mass Transfer 4

Civil Engineering (34)

CE 201 Statics 2
CE 300 Dynamics 3
CE 301 Statics and Dynamics 5
CE 311 Strength of Materials 3
CE 330 Fluid Mechanics 4
CE 461 Structural Analysis 4
CE 704 Dynamics and Vibrations 3
CE 730 Intermediate Fluid Mechanics 3
CE 461 Structural Analysis 4
CE 704 Dynamics and Vibrations 3

Electrical Engineering and Computer Science (56)

EECS 211 Circuits I 3
EECS 220 Electromagnetics I 4
EECS 360 Signal and System Analysis 4
EECS 420 Electromagnetics II 4
EECS 444 Control Systems 3
EECS 510 Introduction to the Theory of Computing 3
EECS 560  Data Structures  4
EECS 562  Introduction to Communication Systems  4
EECS 638  Fundamentals of Expert Systems  3
EECS 644  Introduction to Digital Signal Processing  3
EECS 649  Introduction to Artificial Intelligence  3
EECS 660  Fundamentals of Computer Algorithms  3
EECS 662  Programming Languages  3
EECS 672  Introduction to Computer Graphics  3
EECS 718  Graph Algorithms  3
EECS 730  Introduction to Bioinformatics  3
EECS 744  Communications and Radar Digital Signal Processing  3

Mechanical Engineering (20)
ME 201  Statics  2
ME 311  Mechanics of Materials  3
ME 312  Basic Engineering Thermodynamics  3
ME 508  Numerical Analysis of Mechanical Engineering Problems  3
ME 510  Fluid Mechanics  3
ME 612  Heat Transfer  3
ME 682  System Dynamics and Control Systems  3

Curriculum & Instruction (9)
C&T 360  Knowing and Learning in Mathematics and Science  3
C&T 366  Classroom Interactions in Mathematics and Science  3
C&T 460  Project Based Instruction in Mathematics and Science  3

Notes: A student using at least 2 statistics courses for the applied concentration must complete MATH 627 and MATH 628 (or MATH 727 and MATH 728) as a List A sequence. (MATH 627, MATH 628, MATH 727, and MATH 728 do not count for the applied concentration.) A student using at least 2 curriculum & instruction courses for the applied concentration must complete PHSX 211 as one of the natural science courses and must complete at least 1 of the geometry courses MATH 559, MATH 660, or MATH 661.

Courses used to satisfy the core requirements can also be used to complete List A and List B sequences. However, no course can be used for 2 List A or B sequences, and courses used for the Applied Concentration requirement cannot also be counted toward the 24 credit hours of advanced mathematics courses for the B.S. degree.

Some courses satisfying the sequence requirements are taught infrequently. More advanced courses can be substituted for lower level courses in many cases. Consult the mathematics department for expected course offerings and substitutions.

Below is a sample 4-year plan for students pursuing the BS in Mathematics. To view the list of courses approved to fulfill KU Core Goals, please visit the KU Core website (http://kucore.ku.edu/courses).

This degree plan assumes students will have the equivalent of MATH 104 prior to the freshman year, fall semester.
Elective (Total Hours)  3  Elective (Total Hours)  3  

15  15

Total Hours: 120-122

1 Students are required to select one 2-course sequence from List A and a second 2-course sequence from either List A or List B. Refer to the Degree Requirements tab for a list of courses that can fulfill this major requirement.

2 Students are required to complete a total of 24 credit hours of mathematics courses numbered MATH 450 and above.

3 The Applied Concentration consists of 3 courses, totaling at least 8 credit hours, that make significant use of mathematics. At least 2 courses must be in the same area. Courses from List C have been approved for this requirement. Refer to the Degree Requirements tab for a list of courses that can fulfill this major requirement.

4 Most courses that count for the Applied Concentration have one or more pre-requisites that may or may not apply to other degree requirements.

5 Students using MATH 627-MATH 628 as their List A sequence need not take MATH 526; MATH 526 is required for those not taking MATH 628 or MATH 728.

Please note:

All students in the College of Liberal Arts and Sciences are required to complete 120 total hours of which 45 hours must be at the Jr/Sr (300+) level.

The same course cannot be used to fulfill more than one KU Core Goal.

Departmental Honors

For undergraduate departmental honors, the student must satisfy the College requirements for honors, attain a grade-point average of 3.5 in all mathematics courses numbered 500 and above. The student must also complete two out of the following four sequences: MATH 727 and MATH 728; MATH 765 and MATH 766; MATH 781 and MATH 782; and MATH 790 and MATH 791, with a grade no lower than B- in each of these courses. The student must make a satisfactory oral presentation to the department, preferably on a topic related to his or her mathematics course work. Preparation should include enrollment in MATH 699 Directed Reading (for 1 or more credit hours) with a faculty mentor.