

# APPLIED MATHEMATICS (PLEASE SEE NOTE BELOW)

**NOTE: Admission to this program was discontinued effective October 5, 2021 and a teach-out plan is in place for current students.**

Home Department: Mathematics

Department Head:

Adam Salminen, Ph.D.  
Room 2-100A AB, 810-762-9557  
math@kettering.edu

## Applied Mathematics Program Curriculum Requirements

Code	Title	Credit Hours
<b>First Year Experience</b>		
CILE-101	First Year Foundations	1
<b>General Education</b>		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
LA-201	Sophomore Seminar: Exploring the Human Condition	4
LA-489	Sr. Seminar: Leadership, Ethics	4
Advanced Humanities Electives <sup>1</sup>		8
Advanced Social Science Electives <sup>1</sup>		8
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
<b>Computer Programming</b>		
Select one of the following:		4
CS-101	Computing & Algorithms I	
ECE-101	MATLAB and C Programming	
IME-211	Algorithms and Computer Programming	
<i>Credit Hours Subtotal:</i>		<i>4</i>
<b>Basic Science</b>		
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
<i>Credit Hours Subtotal:</i>		<i>12</i>
<b>Mathematics</b>		

MATH-101	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
MATH-203	Multivariate Calculus	4
or MATH-203X	Multivariate Calculus	
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
MATH-307	Matrix Algebra	4
MATH-308	Abstract Algebra	4
MATH-313	Boundary Value Problems	4
MATH-321	Real Analysis I	4
MATH-327	Probability & Stochastic Modeling	4
MATH-412	Complex Variables	4
MATH-416	Vector Analysis	4
<i>Credit Hours Subtotal:</i>		<i>48</i>

<b>Concentration</b>	
Select one of the following concentrations:	28-36
(Courses for each concentration are listed in the Plan of Study Tab)	
Actuarial Science	
Applied and Computational Mathematics	
Applied Statistics	
Mathematical Biology	
<i>Credit Hours Subtotal:</i>	

<b>Electives</b>	
Science Electives	8
Free Electives	16-24
<i>Credit Hours Subtotal:</i>	

<b>Culminating Undergraduate Experience</b>		
CILE-400	Culminating Undergraduate Experience: Thesis <sup>2</sup>	4

**(Minimum) Total Credits Required for Program: 161**

<sup>2</sup> Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

## Representative Program

Course	Title	Credit Hours
<b>Freshman I</b>		
CILE-101	First Year Foundations	1
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
COMM-101	Rhetoric & Writing	4
MATH-101	Calculus I	4
Select one of the following:		4
CS-101	Computing & Algorithms I	
IME-211	Algorithms and Computer Programming	
ECE-101	MATLAB and C Programming	
<b>Credit Hours</b>		<b>17</b>

<b>Freshman II</b>		
ECON-201	Economic Principles	4
MATH-102	Calculus II	4
MATH-307	Matrix Algebra	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
<b>Credit Hours</b>		<b>16</b>
<b>Sophomore I</b>		
MATH-203	Multivariate Calculus	4
MATH-308	Abstract Algebra	4
LS-201	Sophomore Seminar: Exploring the Human Condition	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
<b>Credit Hours</b>		<b>16</b>
<b>Sophomore II</b>		
MATH-204	Differential Equations & Laplace Transforms	4
MATH-327	Probability & Stochastic Modeling	4
Science Elective		4
Free Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Total Credit Hours</b>		<b>65</b>

### Actuarial Science Concentration

Course	Title	Credit Hours
<b>Junior I</b>		
MATH-258	Probability and Statistics	4
MATH-313	Boundary Value Problems	4
MATH-350	Financial Mathematics	4
BUSN-221	Financial Accounting	4
Advanced Communications Elective		4
<b>Credit Hours</b>		<b>20</b>
<b>Junior II</b>		
MATH-305	Numerical Methods and Matrices	4
MATH-321	Real Analysis I	4
ECON-342	Intermediate Microeconomics: Managerial Economics	4
Advanced Humanities Elective		4
Free Elective		4
<b>Credit Hours</b>		<b>20</b>
<b>Senior I</b>		
MATH-427	Statistical Inference & Modeling	4
MATH-360	Life Contingencies I	4
MATH-416	Vector Analysis	4
Science Elective		4
Advanced Social Science Elective		4
<b>Credit Hours</b>		<b>20</b>
<b>Senior II</b>		
MATH-361	Life Contingencies II	4
MATH-412	Complex Variables	4

ECON-344	Intermediate Macroeconomics: Economic Growth and Fluctuation	4
Free Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Senior III</b>		
MATH-450	Statistics for Risk Modeling	4
BUSN-331	Financial Management	4
LS-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Advanced Comm, Humanities or Social Science Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Any Term</b>		
CILE-400	Culminating Undergraduate Experience: Thesis	4
<b>Credit Hours</b>		<b>4</b>
<b>Total Credit Hours</b>		<b>96</b>

(Minimum) Total Credits Required for Program: 161

### Applied and Computational Mathematics Concentration

Course	Title	Credit Hours
<b>Junior I</b>		
MATH-305	Numerical Methods and Matrices	4
MATH-313	Boundary Value Problems	4
Advanced Communications Elective		4
Free Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Junior II</b>		
MATH-328	Methods of Applied Mathematics	4
MATH-418	Intermediate Differential Equations	4
Advanced Humanities		4
Free Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Senior I</b>		
MATH-416	Vector Analysis	4
Engineering Applications/CS Sequence		4
Advanced Social Science Elective		4
Free Electives		8
<b>Credit Hours</b>		<b>20</b>
<b>Senior II</b>		
MATH-321	Real Analysis I	4
MATH-423	Partial Differential Equations	4
Engineering Applications/CS Sequence		4
Science Elective		4
Free Elective		4
<b>Credit Hours</b>		<b>20</b>
<b>Senior III</b>		
LS-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MATH-412	Complex Variables	4
Engineering Applications/CS Sequence		8

Advanced Comm, Humanities or Social Science Elective	4
<b>Credit Hours</b>	<b>20</b>
<b>Any Term</b>	
CILE-400 Culminating Undergraduate Experience: Thesis	4
<b>Credit Hours</b>	<b>4</b>
<b>Total Credit Hours</b>	<b>96</b>

**(Minimum) Total Credits Required for Program: 161**

The student will develop an engineering applications or computer science sequence with the assistance of an academic advisor. The following are examples of a possible CS-sequence, EE-sequence, MECH-sequence, and PHYS sequence.

Code	Title	Credit Hours
<b>CS-Sequence</b>		
CS-102	Computing & Algorithms II	4
CS-203	Computing & Algorithms III	4
CS-312	Theory of Computation	4
CS-415	Cryptography	4
<b>EE-Sequence</b>		
EE-210	Circuits I	3
EE-240	Electromagnetic Fields and Applications	4
EE-340	Electromagnetic Wave Propagation	4
EE-348	Electromagnetic Compatibility	4
<b>MECH-Sequence</b>		
MECH-210	Statics	4
MECH-212	Mechanics of Materials	4
MECH-310	Dynamics	4
MECH-320	Thermodynamics	4
<b>PHYS-Sequence</b>		
PHYS-302	Vibration, Sound and Light	4
PHYS-362	Modern Physics and Lab	4
PHYS-412	Theoretical Mechanics	4
PHYS-462	Quantum Mechanics	4

**Applied Statistics Concentration**

Course	Title	Credit Hours
<b>Junior I</b>		
MATH-258	Probability and Statistics	4
MATH-313	Boundary Value Problems	4
MATH-412	Complex Variables	4
Advanced Communications Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Junior II</b>		
MATH-305	Numerical Methods and Matrices	4
MATH-450	Statistics for Risk Modeling	4
Industrial/MATH Elective <sup>1</sup>		4
Free Elective		4

Advanced Humanities Elective	4	
<b>Credit Hours</b>	<b>20</b>	
<b>Senior I</b>		
MATH-350	Financial Mathematics	4
MATH-416	Vector Analysis	4
MATH-427	Statistical Inference & Modeling	4
Free Elective	4	
Advanced Social Science Elective	4	
<b>Credit Hours</b>	<b>20</b>	

<b>Senior II</b>		
IME-471	Quality Control	4
IME-473	Design of Experiments	4
MATH-321	Real Analysis I	4
Free Elective	4	
Science Elective	4	
<b>Credit Hours</b>	<b>20</b>	

<b>Senior III</b>		
LS-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
Industrial/Math Elective <sup>1</sup>		4
Advanced Comm, Humanities or Advanced Social Science Elective		4
Free Elective		4
<b>Credit Hours</b>	<b>16</b>	

<b>Any Term</b>		
CILE-400	Culminating Undergraduate Experience: Thesis	4
<b>Credit Hours</b>	<b>4</b>	
<b>Total Credit Hours</b>	<b>96</b>	

**(Minimum) Total Credits Required for Program: 161**

<sup>1</sup> The student should select at least two IME/MATH electives from the following courses: IME-321, IME-422, MATH-428.

**Mathematical Biology Concentration**

Course	Title	Credit Hours
<b>Junior I</b>		
MATH-313	Boundary Value Problems	4
Advanced Chemistry Elective		4
Advanced Communications Elective		4
Advanced Humanities Elective		4
<b>Credit Hours</b>		<b>16</b>
<b>Junior II</b>		
MATH-328	Methods of Applied Mathematics	4
MATH-418	Intermediate Differential Equations	4
BIOL-241	Human Biology	3
BIOL-242	Human Biology Lab	1
Advanced Social Science Elective		4
Free Elective		4
<b>Credit Hours</b>		<b>20</b>

**Senior I**

MATH-258	Probability and Statistics	4
MATH-416	Vector Analysis	4
BIOL-341	Anatomy and Physiology	4
Science Elective		4
Advanced Comm, Humanities or Advanced Social Science Elective		4
<b>Credit Hours</b>		<b>20</b>

**Senior II**

MATH-321	Real Analysis I	4
MATH-330	Biostatistics	4
BIOL-381	Molecular Biology	4
BIOL-382	Molecular Biology Lab	3
Free Elective		4
<b>Credit Hours</b>		<b>19</b>

**Senior III**

BIOL-351	Genetics	4
LS-489	Senior Seminar: Leadership, Ethics, and Contemporary Issues	4
MATH-412	Complex Variables	4
Free Electives		8
<b>Credit Hours</b>		<b>20</b>

**Any Term**

CILE-400	Culminating Undergraduate Experience: Thesis	4
<b>Credit Hours</b>		<b>4</b>
<b>Total Credit Hours</b>		<b>99</b>

**(Minimum) Total Credits Required for Program: 161**