

# APPLIED MATHEMATICS - B.S.

## College of Arts and Sciences

Department of Mathematical Sciences  
 233 Mathematics and Computer Science Building  
 Kent Campus  
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## Description

The Bachelor of Science degree in Applied Mathematics emphasizes the tools most useful in science, engineering and technology applications: mathematical modeling, scientific computing and probability and statistics.

The Applied Mathematics major comprises the following concentrations:

- The **Applied Mathematics** concentration emphasizes the classical aspects of the discipline, which are rooted in mathematical modeling and applications in the sciences. It couples well with the Physics minor or major.
- The **Computational Mathematics** concentration is designed for students with interests in numerical modeling and scientific computing. It pairs well with the Computer Science minor or major.
- The **Financial Mathematics** concentration prepares students for graduate programs in mathematical or computational finance or financial engineering.
- The **Probability and Statistics** concentration emphasizes the mathematics underlying processes that involve randomness and the mathematical tools used in the analysis of data.

## Fully Offered At:

- Kent Campus

## Admission Requirements

The university affirmatively strives to provide educational opportunities and access to students with varied backgrounds, those with special talents and adult students who graduated from high school three or more years ago.

**Freshman Students on the Kent Campus:** The freshman admission policy on the Kent Campus is selective. Admission decisions are based upon the following: cumulative grade point average, ACT and/or SAT scores, strength of high school college preparatory curriculum and grade trends. The Admissions Office at the Kent Campus may defer the admission of students who do not meet admissions criteria but who demonstrate areas of promise for successful college study. Deferred applicants may begin their college coursework at one of seven regional campuses of Kent State University. For more information on admissions, including additional requirements for some academic programs, visit the admissions website for new freshmen.

**Freshman Students on the Regional Campuses:** Kent State campuses at Ashtabula, East Liverpool, Geauga, Salem, Stark, Trumbull and Tuscarawas, as well as the Regional Academic Center in Twinsburg, have

open enrollment admission for students who hold a high school diploma, GED or equivalent.

## English Language Proficiency Requirements for International Students:

All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 525 TOEFL score (71 on the Internet-based version), minimum 75 MELAB score, minimum 6.0 IELTS score or minimum 48 PTE score, or by completing the ESL level 112 Intensive Program. For more information on international admission, visit the Office of Global Education’s admission website.

**Transfer, Transitioning and Former Students:** For more information about admission criteria for transfer, transitioning and former students, please visit the admissions website.

## University Requirements

All students in a bachelor’s degree program at Kent State University must complete the following university requirements for graduation.

**NOTE:** University requirements may be fulfilled in this program by specific course requirements. Please see Program Requirements for details.

Destination Kent State: First Year Experience	1
Course is not required for students with 25 transfer credits, excluding College Credit Plus, or age 21+ at time of admission.	
Diversity Domestic/Global (DIVD/DIVG)	2 courses
Students must successfully complete one domestic and one global course, of which one must be from the Kent Core.	
Experiential Learning Requirement (ELR)	varies
Students must successfully complete one course or approved experience.	
Kent Core (see table below)	36-37
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39 (or 42)
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate. Students in a B.A. and/or B.S. degree in the College of Arts and Sciences must complete 42 upper-division credit hours.	
Total Credit Hour Requirement	120
Some bachelor’s degrees require students to complete more than 120 credit hours.	

## Kent Core Requirements

Kent Core Composition (KCMP)	6
Kent Core Mathematics and Critical Reasoning (KMCR)	3
Kent Core Humanities and Fine Arts (KHUM/KFA) (min one course each)	9
Kent Core Social Sciences (KSS) (must be from two disciplines)	6
Kent Core Basic Sciences (KBS/KLAB) (must include one laboratory)	6-7
Kent Core Additional (KADL)	6
<b>Total Credit Hours:</b>	<b>36-37</b>

# Program Requirements

## Major Requirements

Code	Title	Credit Hours
<b>Major Requirements (courses count in major GPA) <sup>1</sup></b>		
CS 13011 & CS 13012	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING (min C grade)	4
or CS 13001	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR) (min C grade)	5
MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II (min C grade)	5
MATH 20011	DECISION-MAKING UNDER UNCERTAINTY <sup>2</sup>	3
MATH 21001	LINEAR ALGEBRA (min C grade)	3
MATH 22005	ANALYTIC GEOMETRY AND CALCULUS III (min C grade)	4
MATH 32044	ORDINARY DIFFERENTIAL EQUATIONS (min C grade)	3
MATH 40011	PROBABILITY THEORY AND APPLICATIONS	3
MATH 40012	THEORY OF STATISTICS	3
MATH 41021	THEORY OF MATRICES	3
MATH 42031	MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS (min C grade)	3
MATH 42039	MODELING PROJECTS (ELR) (WIC) <sup>3</sup>	3
MATH 42201	NUMERICAL COMPUTING I (min C grade)	3
MATH 42202	NUMERICAL COMPUTING II	3
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
Allied Area Electives, choose from the following: <sup>4</sup>		6
BSCI 30050	HUMAN GENETICS	
BSCI 40020	BIOLOGY OF AGING	
CHEM 30050	INTRODUCTION TO MATERIALS CHEMISTRY	
CHEM 30105	ANALYTICAL CHEMISTRY I	
CHEM 30106	ANALYTICAL CHEMISTRY II	
CHEM 30301	INORGANIC CHEMISTRY I	
CHEM 40302	INORGANIC CHEMISTRY II	
CHEM 40303	INORGANIC CHEMISTRY III	
CHEM 40555	PHYSICAL CHEMISTRY I	
CHEM 40556	PHYSICAL CHEMISTRY II	
CHEM 40559	NANOMATERIALS	
CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	
CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES	
CS 33211	OPERATING SYSTEMS	
CS 33901	SOFTWARE ENGINEERING	
CS 35101	COMPUTER ARCHITECTURE	
CS 35201	COMPUTER COMMUNICATION NETWORKS	
CS 38101	INTRODUCTION TO GAME PROGRAMMING	
CS 43006	THEORY OF OBJECT-ORIENTED PROGRAMMING	
CS 43111	STRUCTURE OF COMPILERS	
CS 43202	SYSTEMS ADMINISTRATION	
CS 43203	SYSTEMS PROGRAMMING	
CS 43301	SOFTWARE DEVELOPMENT FOR ROBOTICS	
CS 43305	ADVANCED DIGITAL DESIGN	
CS 43401	SECURE PROGRAMMING	
CS 44001	COMPUTER SCIENCE III-PROGRAMMING PATTERNS	
CS 44003	MOBILE APPS IN IOS PROGRAMMING	
CS 44105	WEB PROGRAMMING I	
CS 44106	WEB PROGRAMMING II	
CS 44201	ARTIFICIAL INTELLIGENCE	
CS 45203	COMPUTER NETWORK SECURITY	
CS 45231	INTERNET ENGINEERING	
CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	
CS 47101	COMPUTER GRAPHICS	
CS 47205	INFORMATION SECURITY	
CS 47206	DATA SECURITY AND PRIVACY	
CS 47207	DIGITAL FORENSICS	
CS 47221	INTRODUCTION TO CRYPTOLOGY	
CS 48101	GAME ENGINE CONCEPTS	
ECON 32025	MONEY, CREDIT AND BANKING	
ECON 32040	INTERMEDIATE MICROECONOMIC THEORY AND APPLICATIONS	
ECON 32041	INTERMEDIATE MACROECONOMIC THEORY AND POLICY	
ECON 32050	APPLIED ECONOMETRICS I (ELR)	
ECON 42050	DATA ACQUISITION, PREPARATION AND VISUALIZATION	
FIN 36054	INTERMEDIATE CORPORATE FINANCE	
FIN 36059	INTERMEDIATE INVESTMENTS	
FIN 46055	ADVANCED DERIVATIVE SECURITIES	
FIN 46064	INTERNATIONAL BUSINESS FINANCE	
FIN 46067	ADVANCED PORTFOLIO ANALYSIS	
GEOG 31062	FUNDAMENTALS OF METEOROLOGY	
GEOG 31064	PRINCIPLES OF CLIMATOLOGY	
GEOG 34070	ECONOMIC GEOGRAPHY	
GEOG 35065	GEOGRAPHY OF TRANSPORTATION AND SPATIAL INTERACTION	
GEOG 39002	STATISTICAL METHODS IN GEOGRAPHY	
GEOG 41065	APPLIED CLIMATOLOGY	
GEOG 44070	SPATIAL ANALYSIS AND LOCATION THEORY	
GEOG 49070	GEOGRAPHIC INFORMATION SCIENCE	
GEOG 49080	ADVANCED GEOGRAPHIC INFORMATION SCIENCE	
GEOG 49085	WEB AND MOBILE GEOGRAPHIC INFORMATION SCIENCE	
GEOG 49162	CARTOGRAPHY AND GEOVISUALIZATION	
GEOG 49163	CARTOGRAPHY AND GEOVISUALIZATION LABORATORY	
GEOG 49230	REMOTE SENSING	
GEOL 31080	STRUCTURAL GEOLOGY	
GEOL 32066	GEOMORPHOLOGY	
GEOL 41025	GENERAL GEOPHYSICS	
GEOL 41080	TECTONICS AND OROGENY	
GEOL 42030	REMOTE SENSING	
GEOL 42035	SCIENTIFIC METHODS IN GEOLOGY	
MATH 30055	MATHEMATICAL THEORY OF INTEREST	
MATH 31011	PROOFS IN DISCRETE MATHEMATICS	
MATH 40028	STATISTICAL LEARNING	

MATH 40051	TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES
MATH 40055	ACTUARIAL MATHEMATICS I (ELR) (WIC)
MATH 40056	ACTUARIAL MATHEMATICS II
MATH 40059	STOCHASTIC ACTUARIAL MODELS
MATH 41001	MODERN ALGEBRA I (ELR) (WIC)
MATH 41002	MODERN ALGEBRA II (ELR) (WIC)
MATH 42001	ANALYSIS I (ELR) (WIC)
MATH 42002	ANALYSIS II (ELR) (WIC)
MATH 42011	MATHEMATICAL OPTIMIZATION
MATH 42021	GRAPH THEORY AND COMBINATORICS
MATH 42024	NUMBERS AND GAMES
MATH 42041	ADVANCED CALCULUS
MATH 42045	PARTIAL DIFFERENTIAL EQUATIONS
MATH 42048	COMPLEX VARIABLES
MATH 45011	DIFFERENTIAL GEOMETRY
MATH 45021	EUCLIDEAN GEOMETRY
MATH 45022	LINEAR GEOMETRY
MATH 46001	ELEMENTARY TOPOLOGY
MATH 47011	THEORY OF NUMBERS
MATH 47021	HISTORY OF MATHEMATICS
PHIL 41035	PHILOSOPHY OF SCIENCE
PHIL 41038	INTERMEDIATE LOGIC
PHIL 41045	METALOGIC
PHY 35101	CLASSICAL MECHANICS
PHY 34000	COSMOLOGY
PHY 36001	INTRODUCTORY MODERN PHYSICS
PHY 36002	APPLICATIONS OF MODERN PHYSICS
PHY 44802	ASTROPHYSICS
PHY 45201	ELECTROMAGNETIC THEORY
PHY 45301	THERMAL PHYSICS
PHY 45401	MATHEMATICAL METHODS IN PHYSICS
PHY 45403	DATA ANALYSIS AND COMPUTATIONAL PHYSICS TECHNIQUES
PHY 45501	ELECTROMAGNETIC WAVES AND MODERN OPTICS
PHY 46101	QUANTUM MECHANICS
PHY 46301	INTRODUCTION TO NUCLEAR AND PARTICLE PHYSICS
PHY 46401	INTRODUCTION TO SOLID STATE PHYSICS

<b>Additional Requirements (courses do not count in major GPA)</b>	
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE 1
Foreign Language (see Foreign Language College Requirement below)	8
Kent Core Composition	6
Kent Core Humanities and Fine Arts (minimum one course from each)	9
Kent Core Social Sciences (must be from two disciplines)	3
Kent Core Additional	3
General Electives (total credit hours depends on earning 120 credit hours, including 42 upper-division credit hours)	7
<b>Concentrations</b>	
Choose from the following:	19
Applied Mathematics	
Computational Mathematics	
Financial Mathematics	
Probability and Statistics	

Minimum Total Credit Hours: 120

- 1 MATH 30011, MATH 34001 and MATH 34002 cannot be applied to the major requirements
- 2 Minimum C grade required for Computational Mathematics and Probability and Statistics concentrations only.
- 3 A minimum C grade must be earned to fulfill the writing-intensive requirement.
- 4 A course may only count for one requirement even though it may appear more than once.

### Applied Mathematics Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
MATH 42041	ADVANCED CALCULUS	3
MATH 42045	PARTIAL DIFFERENTIAL EQUATIONS	3
MATH 42048	COMPLEX VARIABLES	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
Kent Core Social Sciences (must be from two disciplines)		3
Kent Core Additional		3
General Elective		4
Minimum Total Credit Hours:		19

### Computational Mathematics Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
MATH 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
MATH 40024	COMPUTATIONAL STATISTICS	3
MATH 42011	MATHEMATICAL OPTIMIZATION	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
Kent Core Social Sciences (must be from two disciplines)		3
Kent Core Additional		3
Minimum Total Credit Hours:		19

### Financial Mathematics Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
ACCT 23020	INTRODUCTION TO FINANCIAL ACCOUNTING	3
FIN 36053	BUSINESS FINANCE	3
MATH 40051	TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES	3
MATH 42045	PARTIAL DIFFERENTIAL EQUATIONS	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
ECON 22061	PRINCIPLES OF MACROECONOMICS (KSS)	3
General Elective		1
Minimum Total Credit Hours:		19

## Probability and Statistics Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
MATH 40051	TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES	3
MATH 40015	APPLIED STATISTICS	3
MATH 40024	COMPUTATIONAL STATISTICS	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
Kent Core Social Sciences (must be from two disciplines)		3
Kent Core Additional		3
General Electives		4
Minimum Total Credit Hours:		19

## GRADUATION REQUIREMENTS

Minimum Major GPA	Minimum Overall GPA
2.000	2.000

- A minimum grade may be required in some courses

### Foreign Language College Requirement

- Students pursuing the Bachelor of Science degree in the College of Arts and Sciences must complete 8 credit hours of foreign language.<sup>1</sup>
- Minimum Elementary I and II of the same language

<sup>1</sup> All students with prior foreign language experience should take the foreign language placement test to determine the appropriate level at which to start. Some students may begin their university foreign language experience beyond the Elementary I level and will complete the requirement with fewer credit hours and fewer courses. This may be accomplished by: (1) passing a course beyond the Elementary I through Intermediate II level or (2) receiving credit through Credit by Exam (CBE), the College Level Examination Program (CLEP), the Advanced Placement (AP) exam or credit through the International Baccalaureate (IB) program; or (3) being designated a "native speaker" of a non-English language (consult with the College of Arts and Sciences Advising Office for additional information). When students complete the requirement with fewer than 8 credit hours and two courses, they will complete the remaining hours with general electives.

# Roadmaps

- Applied Mathematics Concentration
- Computational Mathematics Concentration
- Financial Mathematics Concentration
- Probability and Statistics Concentration

## APPLIED MATHEMATICS CONCENTRATION

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

Semester One		Credits
!	MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	CS 13011 COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING & CS 13012 or CS 13001 and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	4
	UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
	Kent Core Requirement	3
	Foreign Language	4
Credit Hours		17
Semester Two		
!	MATH 12003 ANALYTIC GEOMETRY AND CALCULUS II	5
	MATH 20011 DECISION-MAKING UNDER UNCERTAINTY	3
	Kent Core Requirement	3
	Foreign Language	4
Credit Hours		15
Semester Three		
!	MATH 22005 ANALYTIC GEOMETRY AND CALCULUS III	4
	MATH 21001 LINEAR ALGEBRA	3
	PHY 23101 GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Kent Core Requirement	3
Credit Hours		15
Semester Four		
	MATH 41021 THEORY OF MATRICES	3
	PHY 23102 GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
	Kent Core Requirement	3
	Kent Core Requirement	3
Credit Hours		14
Semester Five		
!	MATH 32044 ORDINARY DIFFERENTIAL EQUATIONS	3
!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or MATH 42201 or NUMERICAL COMPUTING I	3
!	MATH 42041 ADVANCED CALCULUS or MATH 42048 or COMPLEX VARIABLES	3
	Allied Area Electives	3
	Kent Core Requirement	3
Credit Hours		15
Semester Six		
!	MATH 42039 MODELING PROJECTS (ELR) (WIC) or MATH 42202 or NUMERICAL COMPUTING II	3
!	MATH 42045 PARTIAL DIFFERENTIAL EQUATIONS	3

	Allied Area Elective	3
	Kent Core Requirement	3
	Kent Core Requirement	3
Credit Hours		15
Semester Seven		
!	MATH 40011 PROBABILITY THEORY AND APPLICATIONS	3
!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or MATH 42201 or NUMERICAL COMPUTING I	3
!	MATH 42041 ADVANCED CALCULUS or MATH 42048 or COMPLEX VARIABLES	3
	General Electives	3
	Kent Core Requirement	3
Credit Hours		15
Semester Eight		
!	MATH 40012 THEORY OF STATISTICS	3
!	MATH 42039 MODELING PROJECTS (ELR) (WIC) or MATH 42202 or NUMERICAL COMPUTING II	3
	General Elective	8
Credit Hours		14
Minimum Total Credit Hours:		120

## Computational Mathematics Concentration.

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

<b>Semester One</b>		<b>Credits</b>
!	MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	CS 13011 COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING	4
	& CS 13012 or CS 13001 and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
	UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
	Kent Core Requirement	3
	Foreign Language	4
	Credit Hours	17
<b>Semester Two</b>		
!	MATH 12003 ANALYTIC GEOMETRY AND CALCULUS II	5
	MATH 20011 DECISION-MAKING UNDER UNCERTAINTY	3
	CS 23001 COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
	Foreign Language	4
	Credit Hours	16
<b>Semester Three</b>		
!	MATH 22005 ANALYTIC GEOMETRY AND CALCULUS III	4
	MATH 21001 LINEAR ALGEBRA	3
	PHY 23101 GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Kent Core Requirement	3
	Credit Hours	15
<b>Semester Four</b>		
	MATH 41021 THEORY OF MATRICES	3
	PHY 23102 GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
	Kent Core Requirement	3
	Kent Core Requirement	3
	Kent Core Requirement	3
	Credit Hours	17
<b>Semester Five</b>		
!	MATH 32044 ORDINARY DIFFERENTIAL EQUATIONS	3
	MATH 23022 DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or MATH 42201 or NUMERICAL COMPUTING I	3
	Allied Area Electives	3
	Kent Core Requirement	3
	Credit Hours	15
<b>Semester Six</b>		
	MATH 42011 MATHEMATICAL OPTIMIZATION	3
!	MATH 42039 MODELING PROJECTS (ELR) (WIC) or MATH 42202 or NUMERICAL COMPUTING II	3
	Allied Area Elective	3
	Kent Core Requirement	3
	Kent Core Requirement	3
	Credit Hours	15
<b>Semester Seven</b>		
!	MATH 40011 PROBABILITY THEORY AND APPLICATIONS	3

!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or MATH 42201 or NUMERICAL COMPUTING I	3
	MATH 40024 COMPUTATIONAL STATISTICS	3
	General Electives	3
	Kent Core Requirement	3
	Credit Hours	15
<b>Semester Eight</b>		
!	MATH 40012 THEORY OF STATISTICS	3
!	MATH 42039 MODELING PROJECTS (ELR) (WIC) or MATH 42202 or NUMERICAL COMPUTING II	3
	General Elective	4
	Credit Hours	10
	Minimum Total Credit Hours:	120

### Financial Mathematics Concentration.

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

<b>Semester One</b>		<b>Credits</b>
!	MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	CS 13011 COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING	4
	& CS 13012 or CS 13001 and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
	UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
	Kent Core Requirement	3
	Foreign Language	4
	Credit Hours	17
<b>Semester Two</b>		
!	MATH 12003 ANALYTIC GEOMETRY AND CALCULUS II	5
	MATH 20011 DECISION-MAKING UNDER UNCERTAINTY	3
	Kent Core Requirement	3
	Foreign Language	4
	Credit Hours	15
<b>Semester Three</b>		
	ECON 22060 PRINCIPLES OF MICROECONOMICS (KSS)	3
!	MATH 22005 ANALYTIC GEOMETRY AND CALCULUS III	4
	MATH 21001 LINEAR ALGEBRA	3
	PHY 23101 GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Credit Hours	15
<b>Semester Four</b>		
	ECON 22061 PRINCIPLES OF MACROECONOMICS (KSS)	3
	MATH 41021 THEORY OF MATRICES	3
	PHY 23102 GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
	Kent Core Requirement	3
	Credit Hours	14
<b>Semester Five</b>		
	ACCT 23020 INTRODUCTION TO FINANCIAL ACCOUNTING	3
	MATH 40011 PROBABILITY THEORY AND APPLICATIONS	3
!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS	3
	or MATH 42201 or NUMERICAL COMPUTING I	
	Kent Core Requirement	3
	Kent Core Requirement	3
	Credit Hours	15
<b>Semester Six</b>		
	FIN 36053 BUSINESS FINANCE	3
	MATH 40012 THEORY OF STATISTICS	3
!	MATH 42039 MODELING PROJECTS (ELR) (WIC)	3
	or MATH 42202 or NUMERICAL COMPUTING II	
	Kent Core Requirement	3
	Kent Core Requirement	3
	Credit Hours	15
<b>Semester Seven</b>		
	MATH 40051 TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES	3
	MATH 32044 ORDINARY DIFFERENTIAL EQUATIONS	3

!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS	3
	or MATH 42201 or NUMERICAL COMPUTING I	
	Allied Area Electives	3
	General Electives	3
	Credit Hours	15
<b>Semester Eight</b>		
	MATH 42045 PARTIAL DIFFERENTIAL EQUATIONS	3
!	MATH 42039 MODELING PROJECTS (ELR) (WIC)	3
	or MATH 42202 or NUMERICAL COMPUTING II	
	Allied Area Electives	3
	General Elective	5
	Credit Hours	14
	Minimum Total Credit Hours:	120

## Probability and Statistics Concentration

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

<b>Semester One</b>		<b>Credits</b>
!	MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	CS 13011 COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING	4
	& CS 13012 and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
	or CS 13001 or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
	UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
Foreign Language		4
Credit Hours		17
<b>Semester Two</b>		
!	MATH 12003 ANALYTIC GEOMETRY AND CALCULUS II	5
	MATH 20011 DECISION-MAKING UNDER UNCERTAINTY	3
Kent Core Requirement		3
Foreign Language		4
Credit Hours		15
<b>Semester Three</b>		
!	MATH 22005 ANALYTIC GEOMETRY AND CALCULUS III	4
	MATH 21001 LINEAR ALGEBRA	3
	PHY 23101 GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
Kent Core Requirement		3
Credit Hours		15
<b>Semester Four</b>		
	MATH 41021 THEORY OF MATRICES	3
	PHY 23102 GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
Kent Core Requirement		3
Kent Core Requirement		3
Credit Hours		14
<b>Semester Five</b>		
!	MATH 32044 ORDINARY DIFFERENTIAL EQUATIONS	3
	MATH 40011 PROBABILITY THEORY AND APPLICATIONS	3
!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS	3
	or MATH 42201 or NUMERICAL COMPUTING I	
Allied Area Electives		3
Kent Core Requirement		3
Credit Hours		15
<b>Semester Six</b>		
	MATH 40012 THEORY OF STATISTICS	3
!	MATH 42039 MODELING PROJECTS (ELR) (WIC)	3
	or MATH 42202 or NUMERICAL COMPUTING II	
Allied Area Elective		3
Kent Core Requirement		3
Kent Core Requirement		3
Credit Hours		15
<b>Semester Seven</b>		
	MATH 40024 COMPUTATIONAL STATISTICS	3
	MATH 40051 TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES	3

!	MATH 42031 MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS	3
	or MATH 42201 or NUMERICAL COMPUTING I	
Kent Core Requirement		3
General Electives		3
Credit Hours		15
<b>Semester Eight</b>		
!	MATH 42039 MODELING PROJECTS (ELR) (WIC)	3
	or MATH 42202 or NUMERICAL COMPUTING II	
MATH 40015 APPLIED STATISTICS		3
General Elective		8
Credit Hours		14
Minimum Total Credit Hours:		120