# APPLIED MATHEMATICS - B.S.

**College of Arts and Sciences**
Department of Mathematical Sciences
www.kent.edu/math

## About This Program

Our Bachelor of Science in Applied Mathematics program provides students with a strong foundation in mathematical theory and its application in real-world settings. With experienced faculty, cutting-edge technology and practical experience, you will gain the skills needed to solve complex problems in a variety of industries, from finance and insurance to science and engineering. Enroll now and unlock endless career possibilities with a degree in applied mathematics. Read more...

## Contact Information

- **Xiaoyu Zheng** | xzheng3@kent.edu | 330-672-9089
- Speak with an Advisor
- Chat with an Admissions Counselor

## Program Delivery

- **Delivery:**
  - In person
- **Location:**
  - Kent Campus

## Examples of Possible Careers and Salaries*

### Data scientists and mathematical science occupations, all other

- 30.9% much faster than the average
- 33,200 number of jobs
- $98,230 potential earnings

### Mathematical science teachers, postsecondary

- 1.3% slower than the average
- 60,100 number of jobs
- $73,650 potential earnings

### Mathematicians

- 3.0% about as fast as the average
- 2,900 number of jobs
- $110,860 potential earnings

### Statisticians

- 34.6% much faster than the average
- 42,700 number of jobs
- $92,270 potential earnings

* Source of occupation titles and labor data comes from the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at which half of the workers in the occupation earned more than that amount and half earned less.

## 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.

**First-Year Students on the Kent Campus:** First-year admission policy on the Kent Campus is selective. Admission decisions are based upon cumulative grade point average, strength of high school college preparatory curriculum and grade trends. Students not admissible to the Kent Campus may be administratively referred to one of the seven regional campuses to begin their college coursework. For more information, visit the admissions website for first-year students.

**First-Year Students on the Regional Campuses:** First-year admission to Kent State's campuses at Ashtabula, East Liverpool, Geauga, Salem, Stark, Trumbull and Tuscarawas, as well as the Twinsburg Academic Center, is open to anyone with a high school diploma or its equivalent. For more information on admissions, contact the Regional Campuses admissions offices.

**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 Academic score, or by completing the ELS level 112 Intensive Program. For more information, visit the admissions website for international students.

**Transfer Students:** Students who have attended any other educational institution after graduating from high school must apply as undergraduate transfer students. For more information, visit the admissions website for transfer students.

**Former Students:** Former Kent State students or graduates who have not attended another college or university since Kent State may complete the reenrollment or reinstatement form on the University Registrar's website.

Admission policies for undergraduate students may be found in the University Catalog's Academic Policies.

Some programs may require that students meet certain requirements before progressing through the program. For programs with progression requirements, the information is shown on the program's Coursework tab.

## Program Requirements

### Major Requirements

| Code | Title | Credit Hours |
|---|---|---|
| **Major Requirements (courses count in major GPA) [1]** | | |
| CS 13001 | COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING (min C grade in 13001 or in both 13011 & 13012) | 4 |
| or CS 13011 & CS 13012 | COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING | |
| 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 [2] | 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 (min C grade) | 3 |
| MATH 40012 | THEORY OF STATISTICS (WIC) [3] | 3 |
| MATH 41021 | THEORY OF MATRICES | 3 |
| MATH 42031 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS (min C grade) | 3 |
| MATH 42039 | MODELING PROJECTS (ELR) (WIC) [3] | 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: [4] | | 6 |
| BSCI 30050 | HUMAN GENETICS | |
| BSCI 40020 | BIOLOGY OF AGING | |
| 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 ORGANIZATION | |
| CS 35201 | COMPUTER COMMUNICATION NETWORKS | |
| CS 38101 | INTRODUCTION TO GAME PROGRAMMING | |
| 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 | |
| ESCI 31080 | STRUCTURAL GEOLOGY | |
| ESCI 32066 | GEOMORPHOLOGY | |
| ESCI 41025 | GENERAL GEOPHYSICS | |
| ESCI 41080 | TECTONICS AND OROGENY | |
| ESCI 42030 | REMOTE SENSING | |
| ESCI 42035 | DATA ANALYSIS IN THE EARTH SCIENCES | |
| 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 | CLIMATE AND THE ENVIRONMENT | |
| GEOG 34070 | ECONOMIC GEOGRAPHY | |
| GEOG 39002 | STATISTICAL METHODS IN GEOGRAPHY | |
| GEOG 41065 | APPLIED CLIMATOLOGY | |
| GEOG 49070 | GEOGRAPHIC INFORMATION SCIENCE | |
| GEOG 49080 | ADVANCED GEOGRAPHIC INFORMATION SCIENCE | |
| GEOG 49085 | WEB AND MOBILE GEOGRAPHIC INFORMATION SCIENCE | |
| GEOG 49162 | CARTOGRAPHY | |
| GEOG 49230 | REMOTE SENSING | |
| 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) [3] | |
| MATH 40056 | ACTUARIAL MATHEMATICS II | |
| MATH 40059 | STOCHASTIC ACTUARIAL MODELS | |
| MATH 41001 | MODERN ALGEBRA I (ELR) (WIC) [3] | |
| MATH 41002 | MODERN ALGEBRA II (ELR) (WIC) [3] | |
| MATH 42001 | ANALYSIS I (ELR) (WIC) [3] | |
| MATH 42002 | ANALYSIS II (ELR) (WIC) [3] | |
| 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 | |
| MATH 49992 | INTERNSHIP IN MATHEMATICS (ELR) | |
| PHIL 41035 | PHILOSOPHY OF SCIENCE | |

| PHIL 41038 | INTERMEDIATE LOGIC | |
|---|---|---|
| PHIL 41045 | METALOGIC | |
| PHY 34000 | COSMOLOGY | |
| PHY 35101 | CLASSICAL MECHANICS | |
| 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 | |
| **Additional Requirements (courses do not count in major GPA)** | | |
| UC 10001 | FLASHES 101 | 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 39 upper-division credit hours) | | 7 |
| **Concentrations** | | |
| 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 toward the major requirements.

[2] Minimum C grade required for the Computational Mathematics and the 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 |
|---|---|---|
| **Concentration Requirements (courses count in major GPA)** | | |
| MATH 42041 | ADVANCED CALCULUS | 3 |
| MATH 42045 | PARTIAL DIFFERENTIAL EQUATIONS | 3 |
| MATH 42048 | COMPLEX VARIABLES | 3 |
| **Additional Requirements (courses do not count in major GPA)** | | |
| Kent Core Social Sciences (must be from two disciplines) | | 3 |
| Kent Core Additional | | 3 |
| General Electives | | 4 |
| **Minimum Total Credit Hours:** | | **19** |

## Computational Mathematics Concentration Requirements

| Code | Title | Credit Hours |
|---|---|---|
| **Concentration Requirements (courses count in major GPA)** | | |
| 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 |
| **Additional Requirements (courses do not count in major GPA)** | | |
| 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 |
|---|---|---|
| **Concentration Requirements (courses count in major GPA)** | | |
| 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 |
| **Additional Requirements (courses do not count in major GPA)** | | |
| 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 |
|---|---|---|
| **Concentration Requirements (courses count in major GPA)** | | |
| MATH 40015 | APPLIED STATISTICS | 3 |
| MATH 40024 | COMPUTATIONAL STATISTICS | 3 |
| MATH 40051 | TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES | 3 |
| **Additional Requirements (courses do not count in major GPA)** | | |
| 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, B.S.**

- Students pursuing the Bachelor of Science degree in the College of Arts and Sciences must complete 8 credit hours of foreign language.[1]

- The following programs are exempt from this requirement: The Bachelor of Science in Cybercriminology and the Bachelor of Science in Medical Laboratory Science.[2]
- Minimum Elementary I and II of the same language

[1] 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 start beyond the Elementary I level and will complete the requirement with fewer credit hours and courses. This may be accomplished by (1) passing a course beyond Elementary I through Intermediate II level; (2) receiving credit through one of the alternative credit programs offered by Kent State University; or (3) demonstrating language proficiency comparable to Elementary II of a foreign language. When students complete the requirement with fewer than 8 credit hours and two courses, they will complete remaining credit hours with general electives.

[2] The Bachelor of Science in Medical Laboratory Science exemption exists under another college policy (Three-Plus-One Programs). The Bachelor of Science in Cybercriminology exemption is due to its extensive collaboration with and contribution from the Information Technology program in the College of Applied and Technical Studies, which does not have a foreign language requirement.

# Roadmaps
## 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 |
|---|---|---|---|
| | CS 13001 or CS 13011 *and* CS 13012 | COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING or COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING *and* COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING | 4 |
| ! | MATH 12002 | ANALYTIC GEOMETRY AND CALCULUS I (KMCR) | 5 |
| | UC 10001 | FLASHES 101 | 1 |
| | Foreign Language | | 4 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **17** |
| | **Semester Two** | | |
| ! | MATH 12003 | ANALYTIC GEOMETRY AND CALCULUS II | 5 |
| | MATH 20011 | DECISION-MAKING UNDER UNCERTAINTY | 3 |
| | Foreign Language | | 4 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **15** |
| | **Semester Three** | | |
| | MATH 21001 | LINEAR ALGEBRA | 3 |
| ! | MATH 22005 | ANALYTIC GEOMETRY AND CALCULUS III | 4 |
| | 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 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| ! | MATH 42041 or MATH 42048 | ADVANCED CALCULUS or COMPLEX VARIABLES | 3 |
| | Allied Area Elective | | 3 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **15** |
| | **Semester Six** | | |
| ! | MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) 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 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| ! | MATH 42041 or MATH 42048 | ADVANCED CALCULUS or COMPLEX VARIABLES | 3 |
| | Kent Core Requirement | | 3 |
| | General Elective | | 3 |
| | **Credit Hours** | | **15** |
| | **Semester Eight** | | |
| ! | MATH 40012 | THEORY OF STATISTICS (WIC) | 3 |
| ! | MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| | General Electives | | 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.

| | Semester One | | Credits |
|---|---|---|---|
| | CS 13001 or CS 13011 *and* CS 13012 | COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING or COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING *and* COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING | 4 |
| ! | MATH 12002 | ANALYTIC GEOMETRY AND CALCULUS I (KMCR) | 5 |
| | UC 10001 | FLASHES 101 | 1 |
| | Foreign Language | | 4 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **17** |
| | Semester Two | | |
| | CS 23001 | COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION | 4 |
| ! | MATH 12003 | ANALYTIC GEOMETRY AND CALCULUS II | 5 |
| | MATH 20011 | DECISION-MAKING UNDER UNCERTAINTY | 3 |
| | Foreign Language | | 4 |
| | **Credit Hours** | | **16** |
| | Semester Three | | |
| | MATH 21001 | LINEAR ALGEBRA | 3 |
| ! | MATH 22005 | ANALYTIC GEOMETRY AND CALCULUS III | 4 |
| | 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 23022 | DISCRETE STRUCTURES FOR COMPUTER SCIENCE | 3 |
| ! | MATH 32044 | ORDINARY DIFFERENTIAL EQUATIONS | 3 |
| ! | MATH 42031 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| | Allied Area Elective | | 3 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **15** |
| | Semester Six | | |
| | MATH 42011 | MATHEMATICAL OPTIMIZATION | 3 |
| ! | MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| | Kent Core Requirement | | 3 |
| | Kent Core Requirement | | 3 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **15** |
| | Semester Seven | | |
| ! | MATH 40011 | PROBABILITY THEORY AND APPLICATIONS | 3 |
| | MATH 40024 | COMPUTATIONAL STATISTICS | 3 |
| ! | MATH 42031 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS | 3 |
| | or MATH 42201 | or NUMERICAL COMPUTING I | |
| | Kent Core Requirement | | 3 |
| | General Elective | | 3 |
| | **Credit Hours** | | **15** |
| | Semester Eight | | |
| ! | MATH 40012 | THEORY OF STATISTICS (WIC) | 3 |
| ! | MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| | Allied Area Elective | | 3 |
| | General Electives | | 4 |
| | **Credit Hours** | | **13** |
| | **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.

| | Semester One | | Credits |
|---|---|---|---|
| | CS 13001 or CS 13011 *and* CS 13012 | COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING or COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING *and* COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING | 4 |
| ! | MATH 12002 | ANALYTIC GEOMETRY AND CALCULUS I (KMCR) | 5 |
| | UC 10001 | FLASHES 101 | 1 |
| | Foreign Language | | 4 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **17** |
| | Semester Two | | |
| ! | MATH 12003 | ANALYTIC GEOMETRY AND CALCULUS II | 5 |
| | MATH 20011 | DECISION-MAKING UNDER UNCERTAINTY | 3 |
| | Foreign Language | | 4 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **15** |
| | Semester Three | | |
| | ECON 22060 | PRINCIPLES OF MICROECONOMICS (KSS) | 3 |
| | MATH 21001 | LINEAR ALGEBRA | 3 |
| ! | MATH 22005 | ANALYTIC GEOMETRY AND CALCULUS III | 4 |
| | PHY 23101 | GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB) | 5 |
| | **Credit Hours** | | **15** |
| | Semester Four | | |
| | 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** |
| | Semester Five | | |
| | ACCT 23020 | INTRODUCTION TO FINANCIAL ACCOUNTING | 3 |
| | MATH 40011 | PROBABILITY THEORY AND APPLICATIONS | 3 |
| ! | MATH 42031 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| | Kent Core Requirement | | 3 |
| | Kent Core Requirement | | 3 |
| | **Credit Hours** | | **15** |

**Semester Six**

| | | |
|---|---|---|
| FIN 36053 | BUSINESS FINANCE | 3 |
| MATH 40012 | THEORY OF STATISTICS (WIC) | 3 |
| ! MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| Kent Core Requirement | | 3 |
| Kent Core Requirement | | 3 |
| | Credit Hours | 15 |

**Semester Seven**

| | | |
|---|---|---|
| MATH 32044 | ORDINARY DIFFERENTIAL EQUATIONS | 3 |
| MATH 40051 | TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES | 3 |
| ! MATH 42031 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| Allied Area Elective | | 3 |
| General Elective | | 3 |
| | Credit Hours | 15 |

**Semester Eight**

| | | |
|---|---|---|
| ! MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| MATH 42045 | PARTIAL DIFFERENTIAL EQUATIONS | 3 |
| Allied Area Elective | | 3 |
| General Electives | | 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.

| **Semester One** | | **Credits** |
|---|---|---|
| CS 13001 or CS 13011 *and* CS 13012 | COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING or COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING *and* COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING | 4 |
| ! MATH 12002 | ANALYTIC GEOMETRY AND CALCULUS I (KMCR) | 5 |
| UC 10001 | FLASHES 101 | 1 |
| Foreign Language | | 4 |
| Kent Core Requirement | | 3 |
| | Credit Hours | 17 |

**Semester Two**

| | | |
|---|---|---|
| ! MATH 12003 | ANALYTIC GEOMETRY AND CALCULUS II | 5 |
| MATH 20011 | DECISION-MAKING UNDER UNCERTAINTY | 3 |
| Foreign Language | | 4 |
| Kent Core Requirement | | 3 |
| | Credit Hours | 15 |

**Semester Three**

| | | |
|---|---|---|
| MATH 21001 | LINEAR ALGEBRA | 3 |
| ! MATH 22005 | ANALYTIC GEOMETRY AND CALCULUS III | 4 |
| 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 40011 | PROBABILITY THEORY AND APPLICATIONS | 3 |
| ! MATH 42031 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| Allied Area Elective | | 3 |
| Kent Core Requirement | | 3 |
| | Credit Hours | 15 |

**Semester Six**

| | | |
|---|---|---|
| MATH 40012 | THEORY OF STATISTICS (WIC) | 3 |
| ! MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| Allied Area Elective | | 3 |
| Kent Core Requirement | | 3 |
| Kent Core Requirement | | 3 |
| | Credit Hours | 15 |

**Semester Seven**

| | | |
|---|---|---|
| MATH 40024 | COMPUTATIONAL STATISTICS | 3 |
| MATH 40051 | TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES | 3 |
| ! MATH 42031 or MATH 42201 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS or NUMERICAL COMPUTING I | 3 |
| Kent Core Requirement | | 3 |
| General Elective | | 3 |
| | Credit Hours | 15 |

**Semester Eight**

| | | |
|---|---|---|
| MATH 40015 | APPLIED STATISTICS | 3 |
| ! MATH 42039 or MATH 42202 | MODELING PROJECTS (ELR) (WIC) or NUMERICAL COMPUTING II | 3 |
| General Electives | | 8 |
| | Credit Hours | 14 |
| | **Minimum Total Credit Hours:** | **120** |

# 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.

| | |
|---|---|
| Flashes 101 (UC 10001) | 1 credit hour |
| Course is not required for students with 30+ 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 credit hours |
|---|---|
| Writing-Intensive Course (WIC) | 1 course |
| Students must earn a minimum C grade in the course. | |
| Upper-Division Requirement | 39 credit hours |
| Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate. | |
| Total Credit Hour Requirement | 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 |
| **Total Credit Hours:** | **36-37** |

## Program Learning Outcomes

Graduates of this program will be able to:

1. Recognize problems with mathematical solutions from across disciplines.
2. Use precision and logical rigor to make both concrete and abstract conclusions.
3. Communicate and interact appropriately with different audiences.
4. Collaborate with others across disciplines in diverse contexts.
5. Use mathematical concepts and techniques in practical and applied problems.
6. Use technology to implement mathematical theory in applied contexts.

## Full 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.

Students may apply early to the M.S. in Applied Mathematics and double count 9 credit hours of graduate courses toward both degree programs. See the Combined Bachelor's/Master's Degree Program policy in the University Catalog for more information.

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.