MATHEMATICS - B.S.

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

About This Program

Gain a deep understanding of mathematical concepts and their practical applications while learning from experienced faculty and utilizing state-of-the-art facilities. With a Mathematics B.S. degree from Kent State, you will be equipped with the skills needed to pursue a variety of careers in fields such as finance, education, research and more. Read more...

Contact Information

- **Xiaoyu Zheng** | xzheng3@kent.edu | 330-672-9089
- Speak with an Advisor
  - Kent Campus
  - Stark Campus
- Chat with an Admissions Counselor: Kent Campus | Regional Campuses

Program Delivery

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

Examples of Possible Careers and Salaries*

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

Operations research analysts

- 24.8% much faster than the average
- 105,100 number of jobs
- $86,200 potential earnings

Data scientists and mathematical science occupations, all other

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

Actuaries

- 17.6% much faster than the average
- 27,700 number of jobs
- $111,030 potential earnings

Secondary school teachers, except special and career/technical education

- 3.8% about as fast as the average
- 1,050,800 number of jobs
- $62,870 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.

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 proficiency of the English language (unless they meet specific exceptions) through the submission of an English language proficiency test score or by completing English language classes at Kent State's English as a Second Language Center before entering their program. For more information, visit the admissions website for international students.

Former Students: Former Kent State students who have not attended another institution since Kent State and were not academically dismissed will complete the re-enrollment process through the Financial, Billing and Enrollment Center. Former students who attended another college or university since leaving Kent State must apply for admissions as a transfer or post-undergraduate student.

Transfer Students: Students who attended an educational institution after graduating from high school or earning their GED must apply as transfer students. For more information, visit the admissions website for transfer students.

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

Students may be required to meet certain criteria to progress in their program. Any progression requirements will be listed on the program's Coursework tab

Program Requirements

Major Requirements

Code	Title	Credit Hours
Major Requirements (courses count in major GPA) [1]		
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	3
MATH 21001	LINEAR ALGEBRA (min C grade)	3
MATH 22005	ANALYTIC GEOMETRY AND CALCULUS III (min C grade)	4
MATH 31011	PROOFS IN DISCRETE MATHEMATICS (min C grade)	3
MATH 32044	ORDINARY DIFFERENTIAL EQUATIONS	3
MATH 41001	MODERN ALGEBRA I (ELR) (WIC) (min C grade) [2]	3
MATH 41002	MODERN ALGEBRA II (ELR) (WIC) [2]	3
MATH 41021	THEORY OF MATRICES	3
MATH 42001	ANALYSIS I (ELR) (WIC) (min C grade) [2]	3
MATH 42002	ANALYSIS II (ELR) (WIC) [2]	3
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
Applied Mathematics Sequence, choose from the following: [3]		6-8
MATH 40011 & MATH 40012	PROBABILITY THEORY AND APPLICATIONS and THEORY OF STATISTICS (WIC) [2]	
MATH 40055 & MATH 40056	ACTUARIAL MATHEMATICS I (ELR) (WIC) and ACTUARIAL MATHEMATICS II [2]	
MATH 42031 & MATH 42039	MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS and MODELING PROJECTS (ELR) (WIC) [2]	
MATH 42041 & MATH 42045	ADVANCED CALCULUS and PARTIAL DIFFERENTIAL EQUATIONS	
MATH 42201 & MATH 42202	NUMERICAL LINEAR ALGEBRA and NUMERICAL APPROXIMATION AND OPTIMIZATION	
Computer Science Elective, choose from the following:		4
CS 10062	PROGRAMMING FOR PROBLEM SOLVING IN SCIENCES	
CS 13001	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
CS 13011 & CS 13012	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
Pure Mathematics Electives, choose from the following: [3]		9
MATH 42021	GRAPH THEORY AND COMBINATORICS	
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	
Allied Area Electives, choose from the following: [3]		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 32040	INTERMEDIATE MICROECONOMIC THEORY AND APPLICATIONS	
ECON 32041	INTERMEDIATE MACROECONOMIC THEORY AND POLICY	
ECON 32050	APPLIED ECONOMETRICS I (ELR)	
ECON 32051	APPLIED ECONOMETRICS II	
ECON 42050	DATA ACQUISITION, PREPARATION AND VISUALIZATION	
ECON 42070	GAME THEORY	
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	
GEOG 31062	FUNDAMENTALS OF METEOROLOGY	
GEOG 31064	CLIMATE AND THE ENVIRONMENT	
GEOG 39002	STATISTICAL METHODS IN GEOGRAPHY	
GEOG 41065	DATA ANALYSIS FOR CLIMATE AND THE ENVIRONMENT	
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 38001	HANDS-ON MATHEMATICS	
MATH 40011	PROBABILITY THEORY AND APPLICATIONS	
MATH 40012	THEORY OF STATISTICS (WIC) [2]	
MATH 40015	APPLIED STATISTICS	
MATH 40024	COMPUTATIONAL STATISTICS	
MATH 40028	STATISTICAL LEARNING	
MATH 40051	TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES	
MATH 40055	ACTUARIAL MATHEMATICS I (ELR) (WIC) [2]	
MATH 40056	ACTUARIAL MATHEMATICS II	
MATH 40059	STOCHASTIC ACTUARIAL MODELS	
MATH 42011	MATHEMATICAL OPTIMIZATION	
MATH 42021	GRAPH THEORY AND COMBINATORICS	
MATH 42024	NUMBERS AND GAMES	
MATH 42031	MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS	
MATH 42039	MODELING PROJECTS (ELR) (WIC) [2]	
MATH 42041	ADVANCED CALCULUS	
MATH 42045	PARTIAL DIFFERENTIAL EQUATIONS	
MATH 42048	COMPLEX VARIABLES	
MATH 42201	NUMERICAL LINEAR ALGEBRA	
MATH 42202	NUMERICAL APPROXIMATION AND OPTIMIZATION	
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	
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)		6
Kent Core Basic Sciences		1
Kent Core Additional		6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours)		12
Minimum Total Credit Hours:		**120**

1 MATH 30011, MATH 34001 and MATH 34002 cannot be applied toward major requirements.

2 A minimum C grade must be earned to fulfill the writing-intensive requirement.

3 A course may count toward only one requirement even though it may appear in more than one course list.

Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
2.000	2.000

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.

Roadmap

This roadmap is a recommended semester-by-semester plan of study for this program. Students will work with their advisor to develop a sequence based on their academic goals and history. 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
	UC 10001	FLASHES 101	1

!	Computer Science Elective		4
	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
!	PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Foreign Language		4
		Credit Hours	**17**
	Semester Three		
!	MATH 21001	LINEAR ALGEBRA	3
!	MATH 22005	ANALYTIC GEOMETRY AND CALCULUS III	4
	MATH 31011	PROOFS IN DISCRETE MATHEMATICS	3
	Kent Core Requirement		3
	Kent Core Requirement		3
		Credit Hours	**16**
	Semester Four		
	MATH 32044	ORDINARY DIFFERENTIAL EQUATIONS	3
!	MATH 41021	THEORY OF MATRICES	3
	Kent Core Requirement		3
	Kent Core Requirement		3
	Kent Core Requirement		3
		Credit Hours	**15**
	Semester Five		
!	MATH 41001	MODERN ALGEBRA I (ELR) (WIC)	3
	Allied Area Elective		3
	Pure Mathematics Elective		3
	Kent Core Requirement		3
	Kent Core Requirement		3
		Credit Hours	**15**
	Semester Six		
!	MATH 41002	MODERN ALGEBRA II (ELR) (WIC)	3
	Pure Mathematics Elective		3
	Kent Core Requirement		3
	Kent Core Requirement		1
	General Elective		3
		Credit Hours	**13**
	Semester Seven		
!	MATH 42001	ANALYSIS I (ELR) (WIC)	3
	Allied Area Elective		3
	Applied Mathematics Sequence		3-4
	General Electives		6
		Credit Hours	**15**
	Semester Eight		
!	MATH 42002	ANALYSIS II (ELR) (WIC)	3
	Applied Mathematics Sequence		3-4
	Pure Mathematics Elective		3
	General Elective		3
		Credit Hours	**12**
		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. Reason in mathematical arguments at a level appropriate to the discipline, including using precise definitions, articulating assumptions and reasoning logically to conclusions.
2. Engage effectively in problem solving, including exploring examples, devising and testing conjectures and assessing the correctness of solutions.
3. Approach mathematical problems creatively, including trying multiple approaches and modifying problems when necessary to make them more tractable.
4. Communicate mathematics clearly both orally and in writing.
5. Understand and appreciate connections among different subdisciplines of mathematics.
6. Understand and appreciate connections between mathematics and other disciplines.
7. Be aware of and understand a broad range of mathematical subdisciplines.

Program Policies
Foreign Language Requirements

In general, students may elect any foreign language taught through the Department of Modern and Classical Language Studies. However, certain majors, concentrations and minors require specific languages or limit the languages from which students may choose. In addition, students who plan to pursue graduate study may need particular languages for that study. In such cases, students should seek the advice of the appropriate department before selecting a language.

Progress Toward Fulfillment

College of Arts and Sciences students are encouraged to begin meeting the foreign language requirement as early as possible in their program to ensure timely degree completion.

Mandatory Outcomes Assessment

In addition to the other General Requirements of the college, candidates for an undergraduate degree in the College of Arts and Sciences are required, as a condition of graduation, to participate in an outcomes assessment. These outcomes assessments are conducted by each undergraduate degree program in the College of Arts and Sciences.

Full Description

The Bachelor of Science degree in Mathematics comprises core areas in algebra (number systems, equations, discrete structures), analysis (functions, limits, continuous processes), geometry (space, shape, form) and associated generalizations and abstractions.

The B.S. degree program is recommended for students interested in a flexible option of careers or graduate study in mathematics. Coupled with the Education minor, the program can lead to Ohio teacher licensure.

Students may apply early to the following master's degree programs 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.

- Master of Arts in Economics degree
- Master of Science degree in Pure Mathematics