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’ll 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
• Program Coordinator: 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*
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

Natural sciences managers
• 4.8% about as fast as the average
• 71,400 number of jobs
• $137,940 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

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. 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. 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 Coursework tab.

Program Requirements

Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 12002</td>
<td>ANALYTIC GEOMETRY AND CALCULUS I (KMCR) (min C grade)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 12003</td>
<td>ANALYTIC GEOMETRY AND CALCULUS II (min C grade)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 20011</td>
<td>DECISION-MAKING UNDER UNCERTAINTY</td>
<td>3</td>
</tr>
<tr>
<td>MATH 21001</td>
<td>LINEAR ALGEBRA (min C grade)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 22005</td>
<td>ANALYTIC GEOMETRY AND CALCULUS III (min C grade)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 31011</td>
<td>PROOFS IN DISCRETE MATHEMATICS (min C grade)</td>
<td>3</td>
</tr>
</tbody>
</table>

* 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.
Allied Area Electives, choose from the following:

- Applied Mathematics Sequence, choose from the following:
  - MATH 42002: MODERN ALGEBRA II (ELR) (WIC) 2
  - MATH 42021: THEORY OF MATRICES
  - MATH 42001: ANALYSIS I (ELR) (WIC) (min C grade) 2
  - MATH 42022: ANALYSIS II (ELR) (WIC) 2

- PHY 23101: GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)

Computer Science Elective(s), choose from the following:

- 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:

- 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

Applied Mathematics Sequence, choose from the following:

- MATH 40011 & MATH 40012: PROBABILITY THEORY AND APPLICATIONS and THEORY OF STATISTICS (WIC) 2
- MATH 40055: ACTUARIAL MATHEMATICS I (ELR) (WIC) & MATH 40056, 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 COMPUTING I and NUMERICAL COMPUTING II

Allied Area Electives, choose from the following:

- 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 ORGANIZATION
- 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 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 TECTONICS AND OROGENY
ESCI 42050: REMOTE SENSING
ESCI 42050: REMOTE SENSING
GEOG 31062: FUNDAMENTALS OF METEOROLOGY
GEOG 31064: CLIMATE AND THE ENVIRONMENT
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
GEOG 49230: REMOTE SENSING
MATH 30055: MATHEMATICAL THEORY OF INTEREST
MATH 38001: HANDS-ON MATHEMATICS
MATH 40011: PROBABILITY THEORY AND APPLICATIONS
MATH 40012: THEOREY OF STATISTICS (WIC) 2
MATH 40015: APPLIED STATISTICS
MATH 40024: COMPUTATIONAL STATISTICS
MATH 40028: THEORETICAL STATISTIC LEARNING
Minimum Total Credit Hours: 120

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

Graduation Requirements

<table>
<thead>
<tr>
<th>Minimum Major GPA</th>
<th>Minimum Overall GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.000</td>
<td>2.000</td>
</tr>
</tbody>
</table>

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.
- The Bachelor of Science in Medical Laboratory Science is exempt from this requirement.
- Minimum Elementary I and II of the same language

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 fewer 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.

1 The Bachelor of Science in Medical Laboratory Science exemption exists under another college policy (Three-Plus-One Programs).

Roadmap

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 12002</td>
<td>ANALYTIC GEOMETRY AND CALCULUS I (KMCR)</td>
<td>5</td>
</tr>
<tr>
<td>UC 10001</td>
<td>FLASHES 101</td>
<td>1</td>
</tr>
<tr>
<td>! MATH 20011</td>
<td>DECISION-MAKING UNDER UNCERTAINTY</td>
<td>3</td>
</tr>
<tr>
<td>! PHY 23101</td>
<td>GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)</td>
<td>5</td>
</tr>
<tr>
<td>Foreign Language</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

Semester Two

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 12003</td>
<td>ANALYTIC GEOMETRY AND CALCULUS II</td>
<td>5</td>
</tr>
<tr>
<td>! MATH 22005</td>
<td>ANALYTIC GEOMETRY AND CALCULUS III</td>
<td>4</td>
</tr>
<tr>
<td>! MATH 31011</td>
<td>PROOFS IN DISCRETE MATHEMATICS</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

Semester Three

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 21001</td>
<td>LINEAR ALGEBRA</td>
<td>3</td>
</tr>
<tr>
<td>! MATH 22005</td>
<td>ANALYTIC GEOMETRY AND CALCULUS III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 32044</td>
<td>ORDINARY DIFFERENTIAL EQUATIONS</td>
<td>3</td>
</tr>
<tr>
<td>! MATH 41021</td>
<td>THEORY OF MATRICES</td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashes 101 (UC 10001)</td>
<td>1 hour</td>
</tr>
<tr>
<td>Course is not required for students with 30+ transfer credits (excluding College Credit Plus) or age 21+ at time of admission.</td>
<td></td>
</tr>
<tr>
<td>Diversity Domestic/Global (DIVD/DIVG)</td>
<td>2 courses</td>
</tr>
<tr>
<td>Students must successfully complete one domestic and one global course, of which one must be from the Kent Core.</td>
<td></td>
</tr>
<tr>
<td>Experiential Learning Requirement (ELR)</td>
<td>varies</td>
</tr>
<tr>
<td>Students must successfully complete one course or approved experience.</td>
<td></td>
</tr>
<tr>
<td>Kent Core (see table below)</td>
<td>36-37 credit hours</td>
</tr>
<tr>
<td>Kent Core (see table below)</td>
<td></td>
</tr>
<tr>
<td>Writing-Intensive Course (WIC)</td>
<td>1 course</td>
</tr>
<tr>
<td>Students must earn a minimum C grade in the course.</td>
<td></td>
</tr>
<tr>
<td>Upper-Division Requirement</td>
<td>39 credit hours</td>
</tr>
<tr>
<td>Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate.</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credit Hour Requirement** 120 credit hours

<table>
<thead>
<tr>
<th>Kent Core Requirements</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kent Core Composition (KCMP)</td>
<td>6</td>
</tr>
<tr>
<td>Kent Core Mathematics and Critical Reasoning (KMCR)</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Humanities and Fine Arts (KHUM/KFA) (min one course each)</td>
<td>9</td>
</tr>
<tr>
<td>Kent Core Social Sciences (KSS) (must be from two disciplines)</td>
<td>6</td>
</tr>
<tr>
<td>Kent Core Basic Sciences (KBS/KLAB) (must include one laboratory)</td>
<td>6-7</td>
</tr>
<tr>
<td>Kent Core Additional (KADL)</td>
<td>6</td>
</tr>
</tbody>
</table>

**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.

**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 M.S.in Pure Mathematics program 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.