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

* 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. 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>
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<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>
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</table>
MATH 32044  ORDINARY DIFFERENTIAL EQUATIONS  3
MATH 41001  MODERN ALGEBRA I (ELR) (WIC) (min C grade)  2
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

Computer Science Elective(s), choose from the following:  4
CS 10062  PROGRAMMING FOR PROBLEM SOLVING IN SCIENCES
CS 13001  COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING
CS 13011  COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING
CS 13012  and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING

Pure Mathematics Electives, choose from the following:  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

Applied Mathematics Sequence, choose from the following:  6-8
MATH 40012  PROBABILITY THEORY AND APPLICATIONS
MATH 40011  and THEORY OF STATISTICS (WIC)  2
MATH 40055  ACTUARIAL MATHEMATICS I (ELR) (WIC)
MATH 40056  and ACTUARIAL MATHEMATICS II  2
MATH 42031  MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS
MATH 42039  and MODELING PROJECTS (ELR) (WIC)  2
MATH 42041  ADVANCED CALCULUS
MATH 42045  and PARTIAL DIFFERENTIAL EQUATIONS
MATH 42201  NUMERICAL COMPUTING I
MATH 42202  and NUMERICAL COMPUTING II

Allied Area Electives, choose from the following:  3  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 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 ANALYSIS IN THE EARTH SCIENCES
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  THEORY OF STATISTICS (WIC)  2
MATH 40015  APPLIED STATISTICS
MATH 40024  COMPUTATIONAL STATISTICS
MATH 40028  STATISTICAL LEARNING
Minimum Total Credit Hours: 120

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.

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

Graduation Requirements

Minimum Major GPA 2.000
Minimum Overall GPA 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 Bachelor of Science in Medical Laboratory Science is exempt from this requirement.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 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.
² 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.

<table>
<thead>
<tr>
<th>Semester One</th>
<th>Credits</th>
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<tbody>
<tr>
<td>! MATH 12002</td>
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<tr>
<td>UC 10001</td>
<td>1</td>
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<td>! Computer Science Elective(s)</td>
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<tr>
<td>Foreign Language</td>
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<td>Kent Core Requirement</td>
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<tr>
<td><strong>Credit Hours</strong></td>
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<thead>
<tr>
<th>Semester Two</th>
<th>Credits</th>
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<td>! PHY 23101</td>
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<td>Foreign Language</td>
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<table>
<thead>
<tr>
<th>Semester Three</th>
<th>Credits</th>
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<tr>
<td>! MATH 21001</td>
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<tr>
<td>! MATH 22005</td>
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<td>MATH 31011</td>
<td>3</td>
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<tr>
<td>Kent Core Requirement</td>
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<tr>
<td>Kent Core Requirement</td>
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<tr>
<th>Semester Four</th>
<th>Credits</th>
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<tr>
<td>MATH 32044</td>
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<tr>
<td>! MATH 41021</td>
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<td><strong>Credit Hours</strong></td>
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### Kent Core Requirement

Semester Five

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>! MATH 41001</td>
<td>MODERN ALGEBRA I (ELR) (WIC)</td>
<td>3</td>
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<tr>
<td>Pure Mathematics Elective</td>
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<td>Kent Core Requirement</td>
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**Credit Hours: 15**

Semester Six

<table>
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<th>Course</th>
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<td>! MATH 41002</td>
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<td>General Elective</td>
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**Credit Hours: 15**

Semester Seven

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<tr>
<td>! MATH 42001</td>
<td>ANALYSIS I (ELR) (WIC)</td>
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**Credit Hours: 13**

Semester Eight

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<td>! MATH 42002</td>
<td>ANALYSIS II (ELR) (WIC)</td>
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<td>Pure Mathematics Elective</td>
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<tr>
<td>General Elective</td>
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**Credit Hours: 15**

**Minimum Total Credit Hours:** 120

### Kent Core Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credit Hours</th>
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</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>

**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.

### 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.