MATHEMATICS - B.S.

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

Examples of Possible Careers*

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

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

Fully Offered
- Kent Campus
- Stark Campus

*Note
Source of occupation titles and labor data is 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.

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.

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.

Freshman Students on the Regional Campuses: Kent State campuses at Ashtabula, East Liverpool, Geauga, Salem, Stark, Trumbull and Tuscarawas, as well as the Twinsburg Academic Center, 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, minimum 48 PTE score or minimum 100 DET 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.

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.

Professional Licensure Disclosure
This program is designed to prepare students to sit for applicable licensure or certification in Ohio. If you plan to pursue licensure or certification in a state other than Ohio, please review state educational requirements for licensure or certification and contact information for state licensing boards at Kent State's website for professional licensure disclosure.

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
- Course is not required for students with 25 transfer credits, excluding College Credit Plus, or age 21+ at time of admission. 
- Kent Core (see table below) 36-37
- Experiential Learning Requirement (ELR) varies 
- Writing-Intensive Course (WIC) 1 course 
- Upper-Division Requirement 39 (or 42) 
- 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

Total Credit Hours: 36-37

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 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>
<tr>
<td>MATH 32044</td>
<td>ORDINARY DIFFERENTIAL EQUATIONS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 41001</td>
<td>MODERN ALGEBRA I (ELR) (WIC) (min C grade)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 41002</td>
<td>MODERN ALGEBRA II (ELR) (WIC)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 41021</td>
<td>THEORY OF MATRICES</td>
<td>3</td>
</tr>
<tr>
<td>MATH 42001</td>
<td>ANALYSIS I (ELR) (WIC) (min C grade)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 42002</td>
<td>ANALYSIS II (ELR) (WIC)</td>
<td>3</td>
</tr>
<tr>
<td>PHY 23101</td>
<td>GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)</td>
<td>5</td>
</tr>
</tbody>
</table>

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: 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 40011 & MATH 40012 | PROBABILITY THEORY AND APPLICATIONS and THEORY OF STATISTICS |
- MATH 40056 & MATH 40056 | ACTUARIAL MATHEMATICS I (ELR) (WIC) and ACTUARIAL MATHEMATICS II |
- MATH 42031 & MATH 42039 | MATHEMATICAL MODELS AND DYNAMICAL SYSTEMS and MODELING PROJECTS (ELR) (WIC) |
- 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: 3
- 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 & CHEM 40303 | INORGANIC CHEMISTRY II and 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 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
GEOG 31062  FUNDAMENTALS OF METEOROLOGY
GEOG 31064  PRINCIPLES OF CLIMATOLOGY
GEOG 35065  GEOGRAPHY OF TRANSPORTATION AND SPATIAL INTERACTION
GEOG 39002  STATISTICAL METHODS IN GEOGRAPHY
GEOG 41065  APPLIED CLIMATOLOGY
GEOG 43001  SOFTWARE DEVELOPMENT FOR ROBOTICS
GEOG 46001  ELEMENTARY TOPOLOGY
GEOG 46002  APPLICATIONS OF MODERN PHYSICS
GEOG 46011  DIFFERENTIAL GEOMETRY
GEOG 46015  ADVANCED GEOPHYSICAL INFORMATION SCIENCE
GEOG 46024  NUMBERS AND GAMES
GEOG 46027  THEORETICAL PHYSICS
GEOG 46031  ADVANCED GEOPHYSICS
GEOG 46032  TECTONICS AND OROGENY
GEOG 46035  SCIENTIFIC METHODS IN GEOLOGY
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 42060  DATA ACQUISITION, PREPARATION AND VISUALIZATION
ECON 42070  GAME THEORY
MATH 30055  MATHEMATICAL THEORY OF INTEREST
MATH 38001  HANDS-ON MATHEMATICS
MATH 40011  PROBABILITY THEORY AND APPLICATIONS
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 40058  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 COMPUTING I
MATH 42202  NUMERICAL COMPUTING II
MATH 45011  PROBABILITY THEORY AND APPLICATIONS
MATH 45012  THEORETICAL STATISTICS
MATH 45015  APPLIED STATISTICS
MATH 45024  COMPUTATIONAL STATISTICS
MATH 45070  MATHEMATICAL METHODS IN PHYSICS
MATH 45072  DATA ANALYSIS AND COMPUTATIONAL PHYSICS TECHNIQUES
MATH 45075  ELECTROMAGNETIC WAVES AND MODERN OPTICS
MATH 45080  APPLIED CALCULUS
MATH 45085  GAME THEORY
MATH 45090  ECONOMETRICS
MATH 45201  ELECTROMAGNETIC THEORY
MATH 45301  THERMAL PHYSICS
MATH 45401  MATHEMATICAL METHODS IN PHYSICS
MATH 45403  DATA ANALYSIS AND COMPUTATIONAL PHYSICS TECHNIQUES
MATH 45501  ELECTROMAGNETIC WAVES AND MODERN OPTICS
MATH 45503  APPLIED ECONOMETRICS II
MATH 46101  QUANTUM MECHANICS
MATH 46301  INTRODUCTION TO NUCLEAR AND PARTICLE PHYSICS
MATH 46401  INTRODUCTION TO SOLID STATE PHYSICS

Additional Requirements (courses do not count in major GPA)
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) 6
Kent Core Basic Sciences 1
Kent Core Additional 6
General Electives (total credit hours depends on earning 120 credit hours, including 42 upper-division credit hours) 12

Minimum Total Credit Hours: 120

1 MATH 30011, MATH 34001 and MATH 34002 may not be applied to the major requirements.
2 A minimum C grade must be earned to fulfill the writing-intensive course requirement.
3 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.

- 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.
## 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>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)</td>
<td>5</td>
</tr>
<tr>
<td>UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE</td>
<td>1</td>
</tr>
<tr>
<td>! Computer Science Elective</td>
<td>4</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Two</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 12003 ANALYTIC GEOMETRY AND CALCULUS II</td>
<td>5</td>
</tr>
<tr>
<td>MATH 20011 DECISION-MAKING UNDER UNCERTAINTY</td>
<td>3</td>
</tr>
<tr>
<td>! PHY 23101 GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)</td>
<td>5</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>4</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Three</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 21001 LINEAR ALGEBRA</td>
<td>3</td>
</tr>
<tr>
<td>! MATH 22005 ANALYTIC GEOMETRY AND CALCULUS III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 31011 PROOFS IN DISCRETE MATHEMATICS</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Four</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 32044 ORDINARY DIFFERENTIAL EQUATIONS</td>
<td>3</td>
</tr>
<tr>
<td>! MATH 41021 THEORY OF MATRICES</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Five</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 41001 MODERN ALGEBRA I (ELR) (WIC)</td>
<td>3</td>
</tr>
<tr>
<td>Allied Area Elective</td>
<td>3</td>
</tr>
<tr>
<td>Pure Mathematics Elective</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirements</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirements</td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Six</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 41002 MODERN ALGEBRA II (ELR) (WIC)</td>
<td>3</td>
</tr>
<tr>
<td>Pure Mathematics Elective</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td>1</td>
</tr>
<tr>
<td>General Electives</td>
<td>3</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Seven</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 42001 ANALYSIS I (ELR) (WIC)</td>
<td>3</td>
</tr>
<tr>
<td>Allied Area Elective</td>
<td>3</td>
</tr>
<tr>
<td>Applied Mathematics Sequence</td>
<td>3</td>
</tr>
<tr>
<td>General Electives</td>
<td>6</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Eight</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>! MATH 42002 ANALYSIS II (ELR) (WIC)</td>
<td>3</td>
</tr>
<tr>
<td>Applied Mathematic Sequence</td>
<td>3</td>
</tr>
<tr>
<td>Minimum Total Credit Hours:</td>
<td>120</td>
</tr>
</tbody>
</table>