

# MATHEMATICAL SCIENCES



Excellence in Action

## COLLEGE OF ARTS AND SCIENCES

The Department of Mathematical Sciences at Kent State University offers undergraduate programs in mathematics, applied mathematics, statistics and mathematics courses used toward programs for future math teachers.

There are many benefits to majoring or minoring in mathematics. These include a wide variety of career opportunities and a relatively high earning potential. Many employment opportunities for mathematicians exist in government, industry and education. Moreover, the options that are available in choosing between mathematics and applied mathematics allow for a high degree of flexibility in designing one's program of study. Students can choose from a large variety of elective mathematics courses. In addition, students can pursue a dual major such as mathematics and physics or incorporate a related minor, such as computer science, into a math major. Students in areas such as business, economics, finance and social sciences can greatly improve their marketability by obtaining a minor in mathematics or applied math. A minor in one of the mathematics areas is a particularly good option for students majoring in the sciences.

The flexibility of our mathematics minor programs is illustrated by the requirements for these minors. Excluding the basic, prerequisite courses, minors in mathematics or applied mathematics consist of 18 credit hours or 21-22 credit hours, respectively. Approximately 9 of these credit hours are devoted to elective courses.

While almost any mathematics degree will provide great benefits for a student, studying mathematics at Kent State offers many advantages. Professors regularly teach courses at all levels (entry level, upper division and graduate). Most class sizes are small, and free tutoring is available to all students throughout the afternoon and evening. Students also have free access to many types of computer resources. In addition, scholarships, student jobs and other forms of financial aid are available to students majoring or minoring in the mathematical sciences.

## UNDERGRADUATE PROGRAMS

At Kent State, the primary concern is the student. The Department of Mathematical Sciences reflects this concern through its efforts to provide the academic atmosphere and close student-faculty associations which encourage intellectual growth and development. Programs are designed to broaden students' perspectives and to help them realize their potential. Kent State offers courses in mathematics (pure and applied), computer science, statistics and mathematics for teachers. A student may concentrate in one area or combine coursework from several areas. Programs allow a student to prepare for graduate study, for high school teaching or for employment in industry.

An undergraduate specializing in mathematics will begin with calculus and introduction to computing, although some students will require college algebra and trigonometry. Well-prepared students are encouraged to establish credit in elementary courses by passing advanced standing examinations. All majors take courses in calculus, computer science and linear algebra.

### PREPARATION FOR A MATHEMATICS CAREER

Students interested in careers as mathematicians should pursue either the mathematics or the applied mathematics degree program. The mathematics program is strongly recommended for students considering graduate study in mathematics. The applied mathematics program is

flexible and designed to suit the needs of students interested in a career in industry, government or in postgraduate study in applied mathematics or other scientific areas.

It is strongly recommended that all majors plan to take the Graduate Record Examination (GRE) early in their senior year. This exam is a requirement for almost all graduate programs. Taking the exam while coursework is fresh in one's memory will help keep options for graduate work open.

### PREPARATION FOR A TEACHING CAREER

Students interested in high school teaching may pursue either the Bachelor of Science or Bachelor of Arts in the College of Arts and Sciences, majoring in one of the mathematical sciences with a minor in education or pursue the Bachelor of Science in Education, with a major or minor in mathematics. Either of these programs leads to teacher licensure in the state of Ohio.

## A MINOR IN MATHEMATICS

For students interested in adolescence/young adult teacher licensure, see reverse side for requirements for a major or minor in mathematics. Computer science majors wishing to apply for admission and financial

## CAREER OPPORTUNITIES

**A degree in mathematics opens the door to a very wide range of satisfying and lucrative career opportunities. Many of those careers are consistently top-ranked in annual job satisfaction surveys that take into account key components including salary, work environment, job stability and benefits. For example, a 2009 survey by the *Wall Street Journal* found that the top three jobs among the 200 they surveyed were: mathematician, actuary and statistician. Each of those careers begins with a mathematics degree (and several others in the top 10 also pair well with a math minor or double major).**

**The pamphlet, *PROFESSIONAL OPPORTUNITIES IN MATHEMATICS*, available through the American Mathematical Association, provides an excellent summary of different types of jobs which use mathematics, including approximate salaries and educational requirements. The Kent State University Career Services Center can provide students with many valuable resources. They offer career counseling and a career exploration course to help students find career goals, as well as help with cover letters, résumés, portfolios and other tools for finding employment. They can also help students find on- and off-campus employment.**

# MATHEMATICAL SCIENCES



support to some of the most competitive graduate programs in computer science are strongly encouraged to obtain at least a minor, and preferably a major, in mathematics (pure or applied).

## MINOR IN MATHEMATICS

### General Mathematics Requirements: Credits

|            |                                    |   |
|------------|------------------------------------|---|
| MATH 12002 | Analytic Geometry and Calculus I   | 5 |
| 12003      | Analytic Geometry and Calculus II  | 5 |
| 21001      | Linear Algebra with Applications   | 3 |
| 22005      | Analytic Geometry and Calculus III | 3 |

### Choose from one of the three categories: 6

#### Algebra

|            |                                       |  |
|------------|---------------------------------------|--|
| MATH 41001 | Introduction to Modern Algebra I (3)  |  |
| 41002      | Introduction to Modern Algebra II (3) |  |
| 41021      | Theory of Matrices (3)                |  |
| 47011      | Theory of Numbers (3)                 |  |

#### Analysis

|            |  |  |
|------------|--|--|
| MATH 42001 | Introduction to Analysis I (3)                     |  |
| 42002      | Introduction to Analysis II (3)                    |  |
| 42041      | Advanced Calculus (3)                              |  |
| 42045      | Introduction to Partial Differential Equations (3) |  |
| 42048      | Introduction to Complex Variables (3)              |  |

#### Geometry/Topology

|            |                                    |  |
|------------|------------------------------------|--|
| MATH 42021 | Graph Theory and Combinatorics (3) |  |
| 45011      | Differential Geometry (3)          |  |
| 45021      | Euclidean Geometry (3)             |  |
| 45022      | Linear Geometry (3)                |  |
| 46001      | Elementary Topology (3)            |  |

### Elective: choose from the following in consultation with students' minor advisor 3

|            |   |  |
|------------|---|--|
| MATH 31011 | Discrete Mathematics (3)                            |  |
| 32044      | Introduction to Ordinary Differential Equations (3) |  |
|            | Mathematics 40000-level course (3)                  |  |

**TOTAL 25**

## MINOR IN ADOLESCENT/YOUNG ADULT EDUCATION

Candidates for either the Bachelor of Arts or Bachelor of Science degree in the College of Arts and Sciences may complete requirements for a minor in education leading to teacher licensure in the state of Ohio. Application should be made in the Office of the Assistant Dean for Student Personnel, 306 White Hall. All mathematics requirements for the Bachelor of Arts or Bachelor of Science and the adolescence/young adult education mathematics requirements listed under the Bachelor of Science in Education degree must be satisfied. A course may be used to satisfy a requirement in both programs.

## PURE AND APPLIED MATH DEGREE REQUIREMENTS:

### General Requirements:

|            |                                    |   |
|------------|------------------------------------|---|
| MATH 22005 | Analytic Geometry and Calculus III | 3 |
| MATH 31011 | Discrete Mathematics Structures    | 3 |
| MATH 34002 | Fundamental Concepts of Geometry   | 3 |

### One of the following:

|             |                                  |   |
|-------------|----------------------------------|---|
| MATH 34001  | Fundamental Concepts of Algebra  | 3 |
| MATH* 41001 | Introduction to Modern Algebra I | 3 |

### One of the following:

|             |                                  |   |
|-------------|----------------------------------|---|
| MATH* 41001 | Introduction to Modern Algebra I | 3 |
| MATH 42001  | Introduction to Analysis I       | 3 |
| MATH 46001  | Elementary Topology              | 3 |
| MATH 47011  | Theory of Numbers                | 3 |

### One of the following:

|            |                       |   |
|------------|-----------------------|---|
| MATH 45011 | Differential Geometry | 3 |
| MATH 45021 | Euclidean Geometry    | 3 |
| MATH 45022 | Linear Geometry       | 3 |

### One of the following:

|            |   |   |
|------------|---|---|
| MATH 32044 | Introduction to Ordinary Differential Equations | 4 |
|------------|---|---|

|            |   |   |
|------------|---|---|
| MATH 40011 | Introduction to Probability Theory Applications | 3 |
|------------|---|---|

|            |                           |   |
|------------|---------------------------|---|
| MATH 42011 | Mathematical Optimization | 3 |
|------------|---------------------------|---|

|            |                               |   |
|------------|-------------------------------|---|
| MATH 42021 | Graph Theory and Combinations | 3 |
|------------|-------------------------------|---|

|            |                     |   |
|------------|---------------------|---|
| MATH 42031 | Mathematical Models | 3 |
|------------|---------------------|---|

|            |                                   |   |
|------------|-----------------------------------|---|
| MATH 42048 | Introduction to Complex Variables | 3 |
|------------|-----------------------------------|---|

|            |                                     |   |
|------------|-------------------------------------|---|
| MATH 42201 | Introduction to Numerical Computing | 3 |
|------------|-------------------------------------|---|

(\*Approved 40000-level MATH courses

### Group A One of the following:

|            |                                  |   |
|------------|----------------------------------|---|
| MATH 34002 | Fundamental Concepts of Geometry | 3 |
|------------|----------------------------------|---|

|            |                    |   |
|------------|--------------------|---|
| MATH 45021 | Euclidean Geometry | 3 |
|------------|--------------------|---|

|            |                 |   |
|------------|-----------------|---|
| MATH 45022 | Linear Geometry | 3 |
|------------|-----------------|---|

### Group B Two of the following:

|            |                                    |   |
|------------|------------------------------------|---|
| MATH 22005 | Analytic Geometry and Calculus III | 3 |
| MATH 30011 | Basic Probability and Statistics   | 3 |

|            |   |   |
|------------|---|---|
| MATH 32044 | Introduction to Ordinary Differential Equations | 4 |
|------------|---|---|

|            |   |   |
|------------|---|---|
| MATH 40011 | Introduction to Probability Theory and Applications | 3 |
|------------|---|---|

|            |                          |   |
|------------|--------------------------|---|
| MATH 42001 | Introduction to Analysis | 3 |
|------------|--------------------------|---|

|            |                                   |   |
|------------|-----------------------------------|---|
| MATH 42048 | Introduction to Complex Variables | 3 |
|------------|-----------------------------------|---|

|            |                                       |   |
|------------|---------------------------------------|---|
| MATH 42201 | Introduction to Numerical Computing I | 3 |
|------------|---------------------------------------|---|

|            |                   |   |
|------------|-------------------|---|
| MATH 47011 | Theory of Numbers | 3 |
|------------|-------------------|---|

**Total 30-31**

## Department of Mathematical Sciences

233 Mathematics and Computer Sciences Bldg.  
330-672-2430  
www.kent.edu/math

## Admissions Office

Kent State University  
P.O. Box 5190  
Kent, OH 44242-0001  
330-672-2444  
1-800-988-KENT  
www.kent.edu/admissions

For information on all of Kent State's degrees and majors, go online to [www.kent.edu/gps](http://www.kent.edu/gps).