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# Mathematics

In the Department of Mathematics and Statistics  
In the College of Sciences

**OFFICE: Geology/Mathematics/Computer Science 413**  
**TELEPHONE: 619-594-6191**

## Faculty

### Mathematics and Applications

Samuel S. P. Shen, Ph.D., Professor of Mathematics, Chair of Department  
José E. Castillo, Ph.D., Professor of Mathematics (M.S. Computational Science Graduate Adviser)  
T. Marc Dunster, Ph.D., Professor of Mathematics (Coordinator)  
John D. Elwin, Ph.D., Professor of Mathematics, Emeritus  
Tunc Geveci, Ph.D., Professor of Mathematics  
Robert D. Grone, Ph.D., Professor of Mathematics (M.A. Mathematics Graduate Adviser)  
Stefen Hui, Ph.D., Professor of Mathematics (M.S. Applied Mathematics Graduate Adviser)  
F. David Lesley, Ph.D., Professor of Mathematics, Emeritus  
Joseph M. Mahaffy, Ph.D., Professor of Mathematics  
Peter Salamon, Ph.D., Professor of Mathematics (Coordinator and M.S. Applied Mathematics Graduate Adviser)  
Ricardo Carretero, Ph.D., Associate Professor of Mathematics  
Stephen J. Kirschvink, Ph.D., Associate Professor of Mathematics  
Michael O'Sullivan, Ph.D., Associate Professor of Mathematics  
Antonio Palacios, Ph.D., Associate Professor of Mathematics  
Peter Blomgren, Ph.D., Assistant Professor of Mathematics  
J. Carmelo Interlando, Ph.D., Assistant Professor of Mathematics  
Vadim Ponomarenko, Ph.D., Assistant Professor of Mathematics  
Roxana N. Smarandache, Ph.D., Assistant Professor of Mathematics

### Mathematics Education

B. Ricardo Nemirovsky, Ph.D., Professor of Mathematics  
Janet Sue Bowers, Ph.D., Associate Professor of Mathematics  
Joanne Lobato, Ph.D., Associate Professor of Mathematics  
Chris L. Rasmussen, Ph.D., Associate Professor of Mathematics  
Susan D. Nickerson, Ph.D., Assistant Professor of Mathematics (M.A.T.S. Graduate Adviser)

## Associateships

Graduate teaching associateships in mathematics are available to a limited number of qualified students. Application blanks and additional information may be secured from the chair of the department.

## General Information

The Department of Mathematics and Statistics offers graduate study leading to the Master of Arts degree in mathematics, the Master of Arts degree for teaching service with a concentration in mathematics, the Master of Science degree in applied mathematics, the Master of Science degree in statistics (see the Statistics section of this bulletin for a description of the statistics program and courses), the Master of Science degree in Applied Mathematics with a Concentration in Mathematical Theory of Communications Systems, and the Master of Science degree in Applied Mathematics with a Concentration in Dynamical Systems.

Faculty active in research direct theses and research projects in most general areas of the mathematical sciences: in complex analysis, differential equations, graph theory, group theory, matrix theory, number theory, numerical analysis, operator theory; in cognitive science, computer education and problem solving within mathematics education; in control theory, mathematical physics, modeling and optimization, financial mathematics, mathematics of communication, and computational mathematics within applied mathematics.

Opportunities for research in mathematics education are available through research facilities in the Center for Research in Mathematics and Science Education.

## Admission to Graduate Study

All students must satisfy the general requirements for admission to the university with classified graduate standing, as described in Part Two of this bulletin.

Students applying for admission should electronically submit the university application available at <http://www.csumentor.edu> along with the \$55 application fee.

All applicants must submit admissions materials to SDSU Graduate Admissions.

### Graduate Admissions

The following materials should be submitted as a complete package directly to:

Graduate Admissions  
Enrollment Services  
San Diego State University  
San Diego, CA 92182-7416

- (1) Official transcripts (in sealed envelopes) from all postsecondary institutions attended;

Note:

- Students who attended SDSU need only submit transcripts for work completed since last attendance.
- Students with international coursework must submit both the official transcript and proof of degree. If documents are in a language other than English, they must be accompanied by a certified English translation.

- (2) GRE scores (<http://www.ets.org>, SDSU institution code 4682);
- (3) TOEFL score, if medium of instruction was in a language other than English (<http://www.ets.org>, SDSU institution code 4682).

## Advancement to Candidacy

All students must satisfy the general requirements for advancement to candidacy as described in Part Two of this bulletin. In addition, the student must have passed a qualifying examination in some programs.

## Specific Requirements for the Master of Arts Degree in Mathematics

**(Major Code: 17011)**

In addition to meeting the requirements for classified graduate standing and the basic requirements for the master's degree as described in Part Two of this bulletin, the student must meet the following requirements:

1. Complete 30 units of approved 500, 600, and 700 level courses, of which at least 24 units must be in mathematics (including computer science). At least 21 units must be at the 600 level or above. Mathematics 600, 601, and 602 may not be part of this degree. No more than six units of Mathematics 797 and 798 will be accepted toward the degree.
2. Among the 30 units of coursework, students must include at least two courses in the area of algebra chosen from courses Mathematics 623, 627A, 627B, and at least two courses in analysis chosen from courses Mathematics 630A, 630B, 631A, 631B.
3. Before entering the program, students should have completed the following courses or their equivalents: Mathematics 521B, 524, 532, 534B. If a student has not had these courses before entering the program, they must be taken during the first year. (A maximum of two of these courses may be applicable toward the degree course requirements.)

- With departmental approval, students may select Plan A and complete Mathematics 799A or Plan B requiring a written comprehensive examination based on materials to be selected by the department from among Mathematics 623, 627A, 627B, 630A, 630B, 631A, 631B.

Plan A is encouraged for most students since it provides an introduction to independent reading and is a natural pathway to independent research.

## Specific Requirements for the Master of Science Degree in Applied Mathematics

(Major Code: 17031)

In addition to meeting the requirements for classified graduate standing and the basic requirements for the master's degree described in Part Two of this bulletin, the student must meet the following requirements:

- Have completed before entering the program, the following courses or their equivalents: Mathematics 524, 534A, 534B, 537, 541; Statistics 551A. At most one of these courses can be counted towards the degree course requirements. Programming proficiency in a computer language is also a prerequisite. Admission to the program as conditionally classified may be granted without some of the coursework above, contingent on the student removing any deficiencies by the end of the first year in the program.
- Complete a minimum of 30 units of approved 500-, 600-, and 700-numbered courses. All programs must include at least 21 units in mathematical science (with the possible exception of a student whose main interest is mathematical modeling) and at least 18 units selected from 600- and 700-numbered courses. No more than six units in Mathematics 797 and 798 will be accepted for credit toward the degree. A program of study must be approved by the graduate adviser.
- The student must select Plan A and complete Mathematics 799A, Thesis. The student must also have an oral defense of their thesis or research, open to the public.

### Concentration in Dynamical Systems

This concentration focuses on interdisciplinary applications of dynamical systems and nonlinear modeling in biology, chemistry, engineering, and physics. Students with interests in modeling and analyzing real life problems through mathematics will benefit from this concentration. To enter the program, students must possess a bachelor's degree with a strong mathematical background. In addition to completing the specific requirements for the Master of Science degree in applied mathematics, students pursuing this concentration

will complete the following 15 units of core courses: Mathematics 531, 537, 538, 636, and 638; 12 units of electives and three units of Mathematics 799A (Thesis/Project). Possible electives include Mathematics 696, Special Topics in Dynamical Systems (Nonlinear Waves, Pattern Formation, Applied Bifurcation of Dynamical Systems, Nonlinear Time Series, Numerical Experiments and Methods in Dynamical Systems, Fractal Geometry, Mathematical Biology/Neural Modeling) to be offered depending on demand and resources. Other recommended electives include Mathematics 542, 623, 637, 668, 693A, 693B, 797; Computer Science 553; Physics 580. Depending on the student's interests and background, electives from other departments may be approved by the adviser.

### Concentration in Mathematical Theory of Communication Systems

This concentration focuses on the area of mathematics relevant to the transmitting and processing of information by digital or analog methods. In addition to meeting the requirements for classified standing in the Master of Science program in applied mathematics, students pursuing this concentration should also have completed Mathematics 521A or its equivalent before entering the program. Students must complete Mathematics 525, 626, 668; two courses selected from Mathematics 528, 625 or 667, and two courses selected from Mathematics 623, 627A, 627B, 630A-630B, 631A-631B. Two additional courses in mathematics or in a related area may be selected with the approval of the program adviser. Either Mathematics 797 (Research) or 799A (Thesis) are required of students in this degree program.

## Communications Systems Certificate

The Communication Systems Certificate provides mathematicians and engineers with the specialized training in the areas of coding, cryptography, and signal processing relevant for the understanding of modern communication systems. This certificate is designed for individuals who need the knowledge this certificate program provides to participate in projects in the area of communication systems and signal processing.

This is an advanced academic certificate at the postbaccalaureate level. The admission requirement is a bachelor's degree in mathematics, engineering, or a closely related field. Individuals with knowledge of the background materials through work or self-study may also be accepted into this program at the discretion of the program director.

Course requirements for the certificate program are the following courses completed with a grade point average of 3.0 or above: Mathematics 522, 525, 626, 667, and 668.

For information on the application process, contact the Department of Mathematics and Statistics or call 619-594-6191.