

of the role of proof in geometry. The pedagogy of this course models that of effective middle school mathematics teachers.

**MAED522** (2)

This course is the second of two which lead prospective mathematics teachers through a series of explorations to develop competence in geometric reasoning, including conjecturing, proving, and disproving. Prospective teachers refine their understanding of the role of proof in geometry. The pedagogy of the course models that of effective middle school mathematics teachers.

**MAED600** (2)

Students investigate concepts of number theory, discrete mathematics, and logic as they apply to middle grades mathematical education. Each topic includes a study of graphic representation of concepts and applications in technology. The pedagogy of the course models that of effective middle school mathematics teachers.

**MAED610** (4)

Investigation of concepts and practices of mathematical modeling with an emphasis on application to middle grades education. The pedagogy of the course models that of effective middle school mathematics teachers.

**MAED625** (2)

Participants investigate topics in mathematics, including probability, programming, fractals, and chaos theory. Emphasis is placed on participant understanding of these topics and their appropriate use as investigations with middle grades students. The pedagogy of the course models that of effective middle school mathematics teachers.

**MAED 630** (1-4)

## MATHEMATICS AND SCIENCE

Joon Hyuk Kang, Mathematics  
 Mickey D. Kutzner, Physics  
 Robert E. Kingman, Physics  
 Margarita C. K. Mattingly, Physics  
 David N. Mbungu, Biology  
 Getahun Merga, Chemistry  
 Robert C. Moore, Mathematics  
 Desmond H. Murray, Chemistry  
 Marlene N. Murray, Biology  
 G. William Mutch, Chemistry  
 D. David Nowack, Chemistry  
 Yun Myung Oh, Mathematics  
 S. Clark Rowland, Physics  
 David A. Steen, Biology  
 John F. Stout, Biology  
 Tiffany Z. Summerscales, Physics  
 Stephen C. Thorman, Physics, Computer Science  
 Lynelle M. Weldon, Mathematics  
 Dennis W. Woodland, Biology  
 Peter A. Wong, Chemistry  
 Robert E. Zdor, Biology

### MS: Mathematics and Science

The Master of Science: Mathematics and Science is designed for students who wish to acquire a breadth of knowledge which cannot be achieved within any one discipline among mathematics, biology, chemistry and physics. Such a degree may be useful for secondary or middle-school teachers who teach mathematics and science subjects, but who do not desire a traditional MAT program; for those who wish to develop skills in areas of overlap in these disciplines; for those who wish to study the interrela

the four areas of Mathematics, Biology, Chemistry or Physics is recommended.

- Earned credit or demonstrated proficiency in the following prerequisites: CPTR125 (FORTRAN or C++) or CPTR151; MATH141, 142, 240, 286; and two out of three year-long

laboratory science courses: BIOL165, 166, CHEM131, 132 and PHYS241, 242, 271, 272. A student may be admitted with deficiencies in the above courses, but this exception requires the student to take additional credits beyond the minimum 32 credits required.

### MS Degree Requirements

1. Compliance with all standards as given in the *Graduate Degree Academic Information* section of the bulletin.
2. Completion of a curriculum consisting of 32–40 credits approved by a supervising committee.
3. Passing a comprehensive examination over two areas from among Mathematics, Biology, Chemistry and Physics.

### Core Courses

MATH405 (3), IDSC526 (2)  
 IDSC698 (1–3) may be repeated up to 6 credits,  
 IDSC575 (1), undergraduate prerequisites\* (0–8), and other courses recommended by the student’s committee.

### Disciplinary Core

For students choosing the Chemistry and/or Physics options:  
 CHEM431, 432 (6) and CHEM441, 442 (2)  
 or PHYS411 (2.5) and PHYS430 (2.5) and PHYS481 (3),

\*Up to 8 credits selected from among the prerequisites listed in the specific admission requirements are added to the minimum 32 credits for the degree.

### Total MS degree credits required—32–40

- The student must include at least 12 credits in each of the two disciplines selected for the degree.
- A student must complete a minimum of 16 credits in courses numbered 500 and above.

### Core

See Interdisciplinary Studies for IDSC course descriptions; Biology for BIOL; Chemistry and Biochemistry for CHEM and BCHM; Mathematics for MATH; Physics for PHYS.

### Procedure

1. Upon acceptance, the student consults with the program coordinator and a graduate advisor to develop a plan of study. Any deficiencies, prerequisites, research, language tools, transfer credits, and residency are discussed to establish the status of the student.
2. The student then submits a plan of study to the program coordinator for approval and identifies three faculty members to serve as a supervisory committee. The approved plan of study becomes the curriculum the student will follow to complete the requirements for the degree. Any changes in the plan of study must therefore be approved by the program coordinator and the committee.
3. All projects must be submitted to the supervising committee at least two months prior to graduation. The student will be expected to give an oral presentation and an oral defense of the project. The program coordinator recommends final project approval after the consent of the committee has been obtained.
4. Comprehensive exams in the two areas of concentration must be completed at least one month prior to graduation.
5. When 50% of all course work has been completed, the student initiates advancement to degree candidacy by submitting the required forms to the program coordinator. When the program coordinator approves the student for graduation, a recommendation is sent to the Records Office and to the Dean of Graduate Studies.
6. Graduation procedures and degree conferral as described in this bulletin.

Hamel Hall, Room 207  
 (269) 471-3555; FAX (269) 471-6339  
 cflores@andrews.edu

### Faculty

Carlos A. Flores, *Chair*  
 Lilianne Doukhan  
 Claudio Gonzalez  
 Julia S. Lindsay  
 Kenneth D. Logan  
 Alan F. Mitchell  
 Carla L. Trynchuk  
 Stephen P. Zork

Academic Programs	Credits
BA: Music	46
With BBA	115
BMus (Bachelor of Music)	
Music Education	82–86
Teacher Certification Requirements	35
Music Performance	91
Minor in Music	26
Minor in Elementary Music Education	26
MA: Music	32
MA: Music Ministry	40
MMus (Master of Music)	
Music Education	35
Performance	34

Faculty of the Department of Music are committed to providing a vibrant musical and learning environment to nurture artistic and creative growth in all students of music, to encourage and guide students through dynamic interaction in classroom and practical experiences as they mature into tomorrow’s music professionals, and to mentor students in responsible use of their talents for service to Christ and to humanity.

Bachelor of Music curricula provide a comprehensive exposure to and experience with the performance, history, and theory of music. Students receive hands-on supervised teaching experience in studio or classroom teaching. Bachelor of Arts curricula are for students wishing to pursue concerted study in music within a liberal arts context.

Non-music majors may take courses in music or participate in music lessons or ensembles for credit or non-credit. See General Education se