Special Requirements and Placement Test

Sequential Course Numbering. All courses with more than one course number must be taken sequentially.

Non-overlapping Credit Requirement. Because there is substantial overlap in material covered in the following groups of courses, no student is granted credit (other than general elective credit) in more than one course from each group:
1. MATH163, 171, 182 (Calculus)
2. MATH215, 281 (Linear Algebra)

Mathematics Departmental Placement Examination (MPE). Any student wishing to enroll in any mathematics or statistics course must have achieved appropriate scores on the MPE of this department, or have prerequisite course(s) accepted for credit. The minimum score on the MPE is indicated as the prerequisite for each course.

Graduate Programs

The Mathematics Department collaborates in the Master of Science: Interdisciplinary Studies (Mathematics and Physical Sciences). See the Interdisciplinary Studies section, p. 85.

Courses

See inside back cover for symbol code.

Mathematics Skills—Arithmetic

Emphasis on arithmetic skills, unit conversions, and problem solving. Does not apply toward any General Education requirement.

Mathematics Skills—Algebra

Emphasis on algebraic skills. At the end of this course, the Mathematics Placement Examination is retaken. Outcome determines eligibility for entrance into certain first-level mathematics courses. Does not apply toward any General Education requirements. MPE 1.0.

Technical Mathematics

Trigonometric and inverse-trigonometric functions with applications; vectors; complex numbers; emphasis on graphical methods. Introduces techniques of elementary calculus. Prerequisite: MATH165 or MPE 3.0.

College Algebra

A study of linear equations and inequalities; algebraic, logarithmic, exponential, and trigonometric functions; polynomials and complex numbers. Includes applications in business and science. Prerequisite: MPE of 2.0.

College Algebra

Distance education —see content above.

Math 1105

Mathematical Skills—Arithmetic

Emphasis on arithmetic skills, unit conversions, and problem solving. Does not apply toward any General Education requirement.

Math 1106

Mathematical Skills—Algebra

Emphasis on algebraic skills. At the end of this course, the Mathematics Placement Examination is retaken. Outcome determines eligibility for entrance into certain first-level mathematics courses. Does not apply toward any General Education requirements. MPE 1.0.

Math 162, 163

Technical Mathematics

Trigonometric and inverse-trigonometric functions with applications; vectors; complex numbers; emphasis on graphical methods. Introduces techniques of elementary calculus. Prerequisite: MATH165 or MPE 3.0.

Math 165

College Algebra

A study of linear equations and inequalities; algebraic, logarithmic, exponential, and trigonometric functions; polynomials and complex numbers. Includes applications in business and science. Prerequisite: MPE of 2.0.

Math 165

College Algebra

Distance education —see content above.

Math 171, 172, 173

Freshman Calculus

Real functions and relations, coordinate geometry, differentiation and integration. Applications of these topics. Prerequisite: MPE 4.0.

Math 182

Calculus with Applications

Introduction to calculus of functions of one variable, including finding maxima and minima; partial derivatives; applications to problems in business and the social sciences. Prerequisite: MATH165 or MPE 3.5.

Math 215

Applied Linear Algebra

Vectors, matrices, determinants, and eigenvalues, with emphasis on applications. Prerequisites: MATH163 or 171, 182; COSC125.

Math 216

Applied Differential Equations

Differential equations as mathematical models; methods of solving first-order equations and linear equations with constant coefficients. Credit may not be earned in this course and MATH282. Prerequisite: MATH163 or 171.

Math 225

Introduction to Discrete Structures

Includes symbolic logic, relations, functions, and Boolean algebra. Applications of these topics to information science. Does not apply to a mathematics major or minor. Prerequisite: MATH163, 171, or 182.

Math 281

Linear Algebra

Vector spaces, linear mappings, solution of sets of linear equations, bilinear and quadratic mappings. Prerequisite: MATH171.

Math 282, 283

Sophomore Calculus

Differential equations, convergence, approximation, curves and surfaces, directional derivatives, multiple integrals, line and surface integrals. Applications of these topics. Prerequisites: MATH173, 281.

Math 355

Foundations of Discrete Mathematics

Such topics as logic, set theory, relations, functions, algebraic structures, and graph theory. Prerequisite: MATH163 or 171.

Math 401, 402

Applied Mathematics

Vector calculus, integral theorems, differential equations, and function transforms. Prerequisite: MATH283.

Math 421

Intermediate Analysis

Careful development of calculus from an axiomatic basis. Prerequisite: MATH283.

Math 427

Mathematical Modeling

Construction of mathematical models in the natural sciences, economics, psychology, and other disciplines. Prerequisites: MATH281; a course in calculus.

Math 431, 432

Alt (4,4)

Courses (Credits)

MATH105

Mathematical Skills—Arithmetic

Emphasis on arithmetic skills, unit conversions, and problem solving. Does not apply toward any General Education requirement.

MATH106

Mathematical Skills—Algebra

Emphasis on algebraic skills. At the end of this course, the Mathematics Placement Examination is retaken. Outcome determines eligibility for entrance into certain first-level mathematics courses. Does not apply toward any General Education requirements. MPE 1.0.

MATH162, 163

Technical Mathematics

Trigonometric and inverse-trigonometric functions with applications; vectors; complex numbers; emphasis on graphical methods. Introduces techniques of elementary calculus. Prerequisite: MATH165 or MPE 3.0.

MATH165

College Algebra

A study of linear equations and inequalities; algebraic, logarithmic, exponential, and trigonometric functions; polynomials and complex numbers. Includes applications in business and science. Prerequisite: MPE of 2.0.

MATH165

College Algebra

Distance education —see content above.

MATH171, 172, 173

(4,4,4)

Freshman Calculus

Real functions and relations, coordinate geometry, differentiation and integration. Applications of these topics. Prerequisite: MPE 4.0.

MATH182

Calculus with Applications

Introduction to calculus of functions of one variable, including finding maxima and minima; partial derivatives; applications to problems in business and the social sciences. Prerequisite: MATH165 or MPE 3.5.

MATH215

Applied Linear Algebra

Vectors, matrices, determinants, and eigenvalues, with emphasis on applications. Prerequisites: MATH163 or 171, 182; COSC125.

MATH216

Applied Differential Equations

Differential equations as mathematical models; methods of solving first-order equations and linear equations with constant coefficients. Credit may not be earned in this course and MATH282. Prerequisite: MATH163 or 171.

MATH225

Introduction to Discrete Structures

Includes symbolic logic, relations, functions, and Boolean algebra. Applications of these topics to information science. Does not apply to a mathematics major or minor. Prerequisite: MATH163, 171, or 182.

MATH281

Linear Algebra

Vector spaces, linear mappings, solution of sets of linear equations, bilinear and quadratic mappings. Prerequisite: MATH171.

MATH282, 283

Sophomore Calculus

Differential equations, convergence, approximation, curves and surfaces, directional derivatives, multiple integrals, line and surface integrals. Applications of these topics. Prerequisites: MATH173, 281.

MATH355

Foundations of Discrete Mathematics

Such topics as logic, set theory, relations, functions, algebraic structures, and graph theory. Prerequisite: MATH163 or 171.

MATH401, 402

Applied Mathematics

Vector calculus, integral theorems, differential equations, and function transforms. Prerequisite: MATH283.

MATH421

Intermediate Analysis

Careful development of calculus from an axiomatic basis. Prerequisite: MATH283.

MATH427

Mathematical Modeling

Construction of mathematical models in the natural sciences, economics, psychology, and other disciplines. Prerequisites: MATH281; a course in calculus.

MATH431, 432

Alt (4,4)
Advanced Calculus
Introduction to topology; theorems on continuity, differentiation, integration, and convergence; introduction to differentiable manifolds. Prerequisite: MATH421.

MATH441, 442
Alt g (4,4)
Algebra
Study of groups, rings, fields, modules, vector spaces, and algebras. Prerequisites: MATH281, 355.

MATH471, 472
Alt g (8)
Geometry
Intuitive background and outline of axiomatic development of Euclidean, non-Euclidean, affine, and projective spaces. Relation of these topics to secondary teaching. Prerequisite: MATH173.

MATH487
Alt (variable)
Special Topics in Mathematics
Consult the instructor in regard to the topic to be covered. Prerequisite: Consent of teacher.

MATH495
(1-4)
Independent Study
Enables students to pursue topics in mathematics not offered in other scheduled courses. Ordinarily a minimum of 4 hours of study per week is expected for each credit. Grades are assigned on the basis of a procedure such as oral or written exams or reports selected by a faculty supervisor.

STATISTICS

STAT251
(4)
Probability Theory with Statistical Applications
Concepts of probability for students desiring a deeper understanding of the principles underlying statistical methods. Definitions of probability random variables, probability distributions, estimators, and statistical decision theory. Prerequisite: MATH163, 171, or 182.

STAT285
(4)
Elementary Statistics
A study of basic descriptive and inferential statistics, including elementary probability and probability distributions, statistical inference involving the binomial, normal, and t distributions, and hypothesis testing. Prerequisite: MPE 2.0. Does not apply to a mathematics major or minor.

STAT285
V (6 qtr; 4 sem)
Elementary Statistics
Distance education—see content above.

STAT286
(4)
Statistical Methods
An introduction to multiple regression, analysis of variance, and non-parametric methods. Prerequisite: STAT251 or 285.

STAT455
(4)
Analysis of Variance
Tests of hypotheses concerning 2 or more populations, contingency table analysis, one-way and two-way analysis of variance, and experimental designs. Prerequisite: STAT286.

HONORS IN MATHEMATICS

MATH217-50
(1)
Honors in Mathematics
The study of mathematical problems where the solution depends more on insight and creativity than on routine computation. Repeatable to 3 credits. Prerequisite: MATH173 and consent of instructor.

GRADUATE LEVEL MATHEMATICS

MATH530
(2-4)
Topics in Teaching Mathematics
A. Algebra
B. Geometry
C. Analysis
D. Applications
Consult with department chair regarding availability in any given year. Repeatable to 8 credits.

MATH540
Alt (2-4)
Topics in Mathematics
Consult with the instructor in regard to the topic to be covered. Prerequisite: Consent of the instructor. Repeatable to 8 credits.

MUSIC

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music@andrews.edu

Faculty
Peter J. Cooper, Chair
Lilianne Doukhan
Carlos A. Flores
Julia S. Lindsay
Kenneth D. Logan
Alan F. Mitchell
Carla L. Trynchuk
Stephen P. Zork

Academic Programs Credits

<table>
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<tr>
<th>Program</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BA: Music</td>
<td>60</td>
</tr>
<tr>
<td>BA/BS in Elementary Music Education</td>
<td>58</td>
</tr>
<tr>
<td>Bachelor of Music (B.Mus.)</td>
<td>75</td>
</tr>
<tr>
<td>Music Education</td>
<td>52-54</td>
</tr>
<tr>
<td>Music Performance</td>
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<tr>
<td>Minor in Music</td>
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<tr>
<td>Minor in Elementary Music Education</td>
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<td>MA: Music</td>
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<tr>
<td>Music Education Performance</td>
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</tbody>
</table>

The Music Department is committed to providing a vibrant environment to nurture artistic and creative growth in all students of music. It strives to encourage and guide students through classroom interaction and practical experiences as they mature into music professionals, and to mentor students in responsible use of their talents for service to Christ and 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/Science 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 for credit or non-credit. See General Education section and course descriptions below for further clarification.

The Andrews University Music Department has been a member of the National Association of Schools of Music since 1964. Music majors may choose to join the student chapter of Music Educators National Conference as well as the Music Department Society of Student Musicians. Selected students are chosen yearly for induction into Pi Kappa Lambda, the national music honor society.

ENROLLMENT

Status as a music major is provisional until the student demonstrates academic and performance skills on an acceptable level. All first-year students must take the Freshman Theory Placement Exam prior to being considered for acceptance as a music major. After the student performs in his/her first jury, the performance instructor makes a recommendation to the music faculty concerning the student's application for admission as a music major. See the Music Department Student Handbook for further information.