SPAN447 **g** **(3)**
Spanish for Translation
An introduction to the basic principles of translation from English to Spanish and from Spanish to English. An approach to techniques used in writing translation. Strong emphasis on written translations. Conducted entirely in Spanish.

SPAN448 **g** **(3)**
Spanish and Latin American Literature and Film
Comparison of artistic and linguistic differences between selected pieces of Spanish and Latin American literature and their film adaptation. Emphasis on language, characters, and cultural aspects of society. Conducted entirely in Spanish.

SPAN449 **g** **(3)**
Spanish for Interpreters
A study of the basic principles of oral interpretation from English to Spanish and from Spanish to English. An approach to techniques used in oral interpretation. Strong emphasis on oral communication. Conducted entirely in Spanish.

SPAN466 **g** **(3)**
Contemporary Spanish-American Literature
A study of selected major Spanish-American writers of our time. Emphasis on research. Conducted entirely in Spanish.

SPAN470 **g** **(3)**
Spanish for International Trade
Spoken and written Spanish common to the Spanish-speaking world of business and industry, with emphasis upon business practices, and the writing and translating of business letters and professional reports. Cross-cultural references provide opportunities for comparative and contrastive analysis of American and Spanish cultural patterns in business settings. Conducted entirely in Spanish.

GRADUATE COURSES

The following courses are available to those preparing for degree language examinations or for improvement in reading ability:

FREN505 **(5)**
Reading French
For students without a working knowledge in French; an introduction to the grammar and syntax of French for the purpose of translating written French into English. May count toward a general elective only.

GRMN505 **(5)**
Reading German
For students without a working knowledge in German; an introduction to the grammar and syntax of German for the purpose of translating written German into English. May count toward a general elective only.

INLS575 **(1-3)**
Topics in _____
A study of selected topics in language, literature, or civilization. Topics and credits to be announced. Repeatable with different topics.

INLS590 **(1-3)**
Directed Study/Reading/Research/Project
Studies in the area of French/Spanish language, literature, or civilization, as determined in consultation with the instructor.

MATHEMATICS

Haughey Hall, Room 121
(269) 471-3423
dhr@andrews.edu
http://www.math.andrews.edu

Faculty
Donald H. Rhoads, *Chair*
Shandelle M. Henson
Ronald D. Johnson
Joon Hyuk Kang
Lynelle M. Weldon

Lecturers
Keith G. Calkins
Shirleen Luttrell

Emeriti
Kenneth L. Franz
Theodore R. Hatcher
Kenneth E. Thomas
Edward J. Specht

Academic Programs	Credits
BS: Mathematics	39
Applied Mathematics	
Preparation for Secondary School Mathematics Teaching	
Preparation for Graduate Study in Mathematics	
BS: Mathematics Education	30
Major in Mathematical Studies	30
Minor in Mathematics	20
Minor in Mathematics Education	20

Mathematics is foundational to physics, engineering, and computer science, and is increasingly important in many fields of study such as finance, accounting, economics, biology, medicine, and environmental science. Students majoring in these and other fields will find that acquiring an additional major in mathematics or mathematical studies greatly enhances the marketability of their degree.

Undergraduate Programs

BS: Mathematics—39

MATH141, 142, 215, 240, 286, 315; STAT340 and at least 15 credits in additional courses chosen in consultation with a Mathematics Department advisor from MATH271, 355, 389, 405, 408, 425, 431, 432, 441, 442, 475, 487, 495.
Cognate Course: CPTR125

Major in Mathematical Studies—30

MATH141, 142, 215, 240 and at least 15 credits in additional courses chosen in consultation with a Mathematics Department advisor from STAT340, CPTR125, MATH271, 286, 315, 355,

polynomial and rational functions; trigonometric functions and identities, vectors. Fulfills the General Education Mathematics reasoning requirement. Prerequisite: MPE ≥ P2 or MATH107. *Fall*

MATH168 **V (4)**
Precalculus
AU-HSI course—see content above. Fulfills the General Education Mathematics reasoning requirement. Prerequisite: MPE ≥ P2 or MATH107.

MATH182 **(3)**
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. Fulfills the General Education Mathematics reasoning requirement. Prerequisite: MPE ≥ P4 or MATH166, 167 or 168 preferred; MATH145 is acceptable. *Spring*

MATH215 **(3)**
Introduction to Linear Algebra
Vectors, matrices, determinants, and eigenvalues, with emphasis on applications and computation. Prerequisite: MATH182 or 141. *Fall*

MATH240 **(4)**
Calculus III
Curves and surfaces, partial derivatives, multivariable calculus; multiple integrals, line and surface integrals; Stokes', Green's and divergence theorems. Prerequisite: MATH142. *Fall*

MATH286 **(3)**
Differential Equations
Elementary differential equations, first order equations, higher order linear equations, systems. Prerequisite: MATH142. *Spring*

MATH315 **Alt (3)**
Linear Algebra
Vector spaces, linear transformations, bilinear and quadratic forms. Prerequisite: MATH215. *Spring*

MATH355 **(3)**
Discrete Mathematics
Selected topics in discrete mathematics, including logic, set theory, relations, functions, algebraic structures and graph theory. Prerequisite: MATH141 or 182. *Fall*

MATH389 **(0.5)**
Mathematics Colloquium
Participation in at least 10 mathematics colloquia or approved colloquia of other departments. Grade is based on attendance and notes taken at the colloquium. Repeatable to 2 credits. S/U. *Fall, Spring*

MATH405 **g Alt (3)**
Applied Mathematics
Solutions of first and second order partial differential equations, and applications. Prerequisites: MATH240, 286. *Fall*

MATH408 **g Alt (3)**
Complex Analysis
Elementary complex analysis, contour integrals, complex series. Prerequisite: MATH240. *Spring*

MATH425 **g Alt (3)**
Numerical Methods and Modeling
Construction of mathematical models. Implementing such models on a computer. Prerequisites: MATH141. *Fall*

MATH431, 432 **g Alt (3, 3)**
Advanced Calculus
Theorems on continuity, differentiation, integration, and convergence; additional selected topics such as topology, differentiable manifolds, and real analysis. Prerequisite: MATH240. *Fall/Spring sequence*

MATH441, 442 **g Alt (3, 3)**
Algebra
Study of groups, rings, fields, modules, vector spaces, and algebras. Prerequisite: MATH240. *Fall/Spring sequence*

MATH475 **g Alt (3)**
Geometry
Axiomatic development of Euclidean, non-Euclidean, affine, and projective spaces. Relation of these topics to secondary teaching. Prerequisites: MATH142 or either MATH141 or 182 and 355. *Fall*

MATH487 **Alt (1-3)**
Special Topics in __________
Consult the instructor in regard to the topic to be covered. Prerequisite: Consent of teacher. Repeatable in different areas.

MATH495 **(1-3)**
Independent Study
Independent study of selected topics in mathematics to enable advanced students to pursue topics not offered in other scheduled courses. The student will study under the supervision of a mathematics professor whose prior approval is required. Ordinarily a minimum of four hours of study per week is expected for each credit. Grades are assigned on the basis of a instructor-selected procedure such as oral or written exams or reports.

STATISTICS

STAT285 **(3)**
Elementary Statistics
A study of basic descriptive and inferential statistics, including elementary probability and probability distributions, statistical inference involving binomial, normal, and *t*-distributions, and hypothesis testing. Prerequisite: MPE ≥ P2 or MATH107. *Fall, Spring*

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more on insight and creativity than on routine computation. Repeatable to 2 credits. Prerequisite: MATH142 and consent of instructor.

GRADUATE

MATH530 **(2-3)**
Topics in Teaching Mathematics
A. Algebra
B. Geometry
C. Analysis
D. Applications
Consult with department chair regarding availability in any given year. Repeatable to 6 credits.

MATH540 **Alt (2-3)**
Topics in Mathematics
Consult with the instructor in regard to the topic to be covered. Prerequisite: Consent of the instructor. Repeatable to 6 credits.

MATHEMATICS EDUCATION

The following courses are available only to participants in the Alternative Certification Experimental Program (Math Endorsement Program) for Middle School Educators, which is jointly administered by the Andrews University School of Education and the Berrien County Intermediate School District. Applications to this Program are initially screened by the School of Education and the Department of Mathematics, and then go through the regular Andrews admissions process. These courses will be taught in rotation, during the regular school year and during the summer, according to a schedule set by the Administrative Committee for the Program.

MAED505 **(2)**
Understanding Numbers and Operations for Middle Grades Educators
This course is designed to strengthen middle school teachers' rational number knowledge and number sense. This includes the in-depth study of rational numbers and operations on rational numbers, the structure of the rational and real number systems, algorithms for computation, estimation strategies, and working with very large and very small numbers. The pedagogy of the course models that of effective middle school mathematics teachers.

MAED510 **(3)**
Exploring Algebra and Functions for Middle Grades Educators
This course extends the middle school teachers' understanding of algebra as a symbolic language. This course moves beyond symbol manipulation to include modeling of physical situations. Students will explore algebraic, linear, and non-linear functions within the context of the course. The pedagogy of the course models that of effective middle school mathematics teachers.

MAED515 **(3)**
Data Analysis for Middle Grades Educators
This course presents an integrated approach to data analysis, statistics, and probability for middle grades math teachers. Instruction focuses on specific real-world data sets and statistical investigations. The pedagogy of the course models that of effective middle school mathematics teachers.

MAED521 **(2)**
Informal Geometry and Measurement for Middle Grades Educators
This course is the first of two which lead prospective mathematics teachers through a series of explorations to develop competence in geometric reasoning, including conjecture, proving, and disproving. Prospective teachers develop a deeper understanding of the