

# MATHEMATICS (MAT)

Degrees offered: B.A. or B.S.

## Requirements for the Mathematics Major

A Major in Mathematics consists of the following 34 hours:

|    |         |                                  |           |
|----|---------|----------------------------------|-----------|
| A. | MAT 151 | Calculus I                       | (3 hours) |
|    | MAT 161 | Calculus II                      | (3 hours) |
|    | MAT 231 | Introductory Statistics          | (3 hours) |
|    | MAT 251 | Calculus III                     | (3 hours) |
|    | MAT 261 | Calculus IV                      | (3 hours) |
|    | MAT 301 | Foundations of Mathematics       | (3 hours) |
|    | MAT 303 | Introduction to Higher Geometry  | (3 hours) |
|    | MAT 305 | Elementary Linear Algebra        | (3 hours) |
|    | MAT 361 | Differential Equations           | (3 hours) |
|    | MAT 401 | Introduction to Real Analysis    | (3 hours) |
|    | MAT 403 | Introduction to Abstract Algebra | (3 hours) |
|    | MAT 411 | Special Studies                  | (1 hour)  |

## Requirements for the Mathematics Minor

A Minor in Mathematics consists of the following 18 hours:

|    |  |                            |           |
|----|--|----------------------------|-----------|
| A. | MAT 151                                      | Calculus I                 | (3 hours) |
|    | MAT 161                                      | Calculus II                | (3 hours) |
|    | MAT 251                                      | Calculus III               | (3 hours) |
|    | MAT 261                                      | Calculus IV                | (3 hours) |
|    | MAT 301                                      | Foundations of Mathematics | (3 hours) |
|    | Three (3) hours of electives (300-400 level) |                            | (3 hours) |

## Requirements for Secondary Mathematics Major Certification

If the student desires certification in Secondary Mathematics by the Alabama Department of Education, the following requirements must be met:

|    |  |                                 |           |
|----|--|---------------------------------|-----------|
| A. | Social Science. The following must be selected from electives in the general education requirements: |                                 |           |
|    | PSY 201  | General Psychology              | (3 hours) |
|    | PSY/SOC 275  | Multiculturalism: A Perspective | (3 hours) |

- B. Science (Select one of the following):
- |         |                        |           |
|---------|------------------------|-----------|
| BIO 103 | Foundations of Biology | (4 hours) |
| BIO 104 | Principles of Biology  | (4 hours) |
| BIO 105 | General Botany         | (4 hours) |
| CHE 100 | Introductory Chemistry | (4 hours) |
| CHE 101 | General Chemistry I    | (4 hours) |
| PHY 102 | Physical Science       | (4 hours) |
| PHY 201 | General Physics        | (4 hours) |
- C. Professional Studies
- |         |   |            |
|---------|---|------------|
| EDU 201 | Introduction to Education   | (3 hours)  |
| EDU 204 | Human Growth and Development  | (3 hours)  |
| EDU 205 | Exceptional Children  | (3 hours)  |
| EDU 302 | Educational Psychology  | (3 hours)  |
| EDU 303 | Evaluation of Learning and Teaching                                     | (3 hours)  |
| EDU 313 | Behavioral and Classroom Management                                     | (3 hours)  |
| EDU 319 | Reading in the Content Areas  | (3 hours)  |
| EDU 409 | Secondary Clinical Practice   | (12 hours) |
| EDU 413 | Materials and Methods of Teaching<br>Mathematics in Secondary Education | (3 hours)  |
| EDU 417 | Instructional Media   | (3 hours)  |

**Teaching Field**

See course requirements for the Mathematics major 34 hours

**Course Descriptions**

**MAT 103            INTRODUCTORY ALGEBRA:** Three hours

An algebra course to help prepare a student for Intermediate Algebra (MAT 105). Topics include operations with rational numbers, exponents, simplifying algebraic expressions, and solving equations. Does not count toward the 128 hours needed for graduation, except for Elementary Education majors.

**MAT 105            INTERMEDIATE ALGEBRA:** Three hours

An algebra course to help prepare a student for MAT 108, Introduction to Mathematics, or MAT 111, Precalculus Algebra. Topics include simplifying algebraic expressions, factoring, and solving linear and quadratic equa-

tions. Does not count toward the mathematics requirement for a B.S. degree except for Elementary Education majors.

Prerequisite: MAT 103 or satisfactory placement test score

**MAT 108            INTRODUCTION TO MATHEMATICS:** Three hours

A problem solving approach to the introduction of areas such as sets, geometry, probability, measurement, statistics and consumer mathematics.

Prerequisite: MAT 105 or a grade C or better in MAT 103, or satisfactory placement test scores

**MAT 111            PRECALCULUS ALGEBRA:** Three hours

A brief study of numbers followed by a study of solving equations (linear, quadratic, radical, systems, etc.) as well as of inequalities, exponents, and logarithms.

Prerequisite: MAT 105 or satisfactory placement test scores

**MAT 121            PRECALCULUS TRIGONOMETRY:** Three hours

A relatively complete course in trigonometry followed by basic analytic and geometric properties of algebraic and trigonometric functions.

Prerequisite: MAT 111 or consent of the instructor

**MAT 151            CALCULUS I:** Three hours

Differentiation of algebraic and trigonometric functions with applications.

Prerequisite: MAT 111 and MAT 121 or satisfactory placement test score

**MAT 161            CALCULUS II:** Three hours

Integration of algebraic, trigonometric, logarithmic, and exponential functions with applications.

Prerequisite: MAT 151

**MAT 231            INTRODUCTORY STATISTICS:** Three hours (QR)

The course topics include descriptive statistics (data analysis, organization, and presentation), probability theory and distributions, and inferential statistics (confidence intervals and hypothesis testing). A course - appropriate technology component is introduced.

Prerequisite: MAT 105 or satisfactory math placement test score or consent of the instructor.

(Cross-listed with BUS 231)

**MAT 251**            **CALCULUS III:** Three hours  
Additional methods of integration, improper integrals, and applications.  
Prerequisite: MAT 161

**MAT 261**            **CALCULUS IV:** Three hours  
Infinite series, functions of several variables, partial derivatives, multiple integrals, and applications.  
Prerequisite: MAT 251

**MAT 301**            **FOUNDATIONS OF MATHEMATICS (CT):** Three hours  
An introduction to the techniques and background necessary for abstract mathematical reasoning. Topics covered are elementary theory of logic, direct and indirect techniques of proofs involving the use of logic, elementary set theory, topics from analysis, and algebraic structures.  
Prerequisite: MAT 251

**MAT 303**            **INTRODUCTION TO HIGHER GEOMETRY (CT):** Three hours  
Fundamental concepts of geometry with emphasis given to logical development from basic assumptions.  
Prerequisite: MAT 161

**MAT 305**            **ELEMENTARY LINEAR ALGEBRA:** Three hours  
Systems of linear equations, matrices, determinants, vector spaces, and linear transformations.  
Prerequisite: MAT 161 or consent of the instructor

**MAT 361**            **DIFFERENTIAL EQUATIONS:** Three hours  
A study of first order and linear second order differential equations with applications. An introduction to linear nth order differential equations.  
Prerequisite: MAT 261 or concurrent enrollment

**MAT 401**            **INTRODUCTION TO REAL ANALYSIS:** Three hours  
An advanced treatment of limits, continuity, sequences and series of functions, and differentiation. Emphasis is on proofs.  
Prerequisite: MAT 251, MAT 301

**MAT 403                    INTRODUCTION TO ABSTRACT ALGEBRA (CT):** Three hours

Introduction to algebraic structures, with an emphasis on groups.

Prerequisite: MAT 251, MAT 301

**MAT 411                    SPECIAL STUDIES:** One to Three hours

A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies. Instructor has the option of awarding a letter grade or a Pass/Fail grade.

Prerequisite: Approval by the Department Head

**MAT 412                    SPECIAL STUDIES:** One to Three hours

A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies. Instructor has the option of awarding a letter grade or a Pass/Fail grade

Prerequisite: Approval by the Department Head

**MAT 413                    SPECIAL STUDIES:** One to Three hours

A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies. Instructor has the option of awarding a letter grade or a Pass/Fail grade. Prerequisite: Approval by the Department Head

**MAT 414                    SPECIAL STUDIES:** One to Three hours

A course for upperclassmen seeking to complete requirements in their major or minor disciplines. Subjects will be taught that do not appear in the College catalog but are of value to a student in her career objectives and/or graduate studies. Instructor has the option of awarding a letter grade or a Pass/Fail grade.

Prerequisite: Approval by the Department Head

**MAT 449, 450            INDEPENDENT STUDY:** Three hours per course

Tutorial courses designed to meet particular needs of the students.

Prerequisite: Approval of the Department Head and Academic Dean

**MAT 471, 472    INTERNSHIP:** One to Six hours

An educational experience where the student is exposed, through actual observations and participation, to the various aspects of a work situation.

Prerequisite: Approval of the Department Head and Academic Dean.