MATHSC2:BS - Bachelor of Science in Mathematical Sciences

Overview

Degree Offered
BS - Bachelor of Science

Program Title
Mathematical Sciences

The Bachelor of Science (BS) in Mathematical Sciences emphasizes a deep study of both the theoretical and practical aspects of mathematics, statistics, and data science. Possible occupations that a graduate of this degree program may, depending on the major/track chosen, be prepared for include actuary, operations research analyst, mathematician, statistician, and data scientist. Furthermore, a student who is planning to continue into graduate study in the mathematical sciences should enroll in this degree program.

For more information, visit the College of Arts, Sciences, and Education website.

To explore more about this program, visit the website below:
Program Website

Academic Group
College of Arts, Sciences, and Education

Diploma Title
Bachelor of Science in Mathematical Sciences

Total Credits
120

CIP Code
27.0101

Requirements

Simple Requisites

Subplan

No Requirement Level

Students must choose one of the following majors:

The major in Mathematics – Comprehensive Track is the traditional Bachelor's degree in mathematics offers students the possibility of learning rigorously and deeply the fundamental ideas and concepts of modern mathematics. This major is mainly designed for students intending to pursue graduate studies in mathematics or graduate schools leading to careers in academia or engineering. Graduates can also enter the work force in fields where analytical skills are needed such as jobs in statistics, actuarial sciences, finance, biotech, and mathematics education.

Academic Progression Requirements

Students admitted to the university are admitted directly to their chosen major. Students are expected to make satisfactory progress based on critical indicators, such as GPA in specific courses or credits earned. In cases where students are not making satisfactory progress, a change of major may be required. Advisors work to redirect students to more appropriate majors when critical indicators are not met.

Major in Mathematics - Comprehensive Track
Type

Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAD2104 - Discrete Mathematics
- MAS3105 - Linear Algebra
- MAA3200 - Intro To Adv Math
- MAA4211 - Advanced Calculus
- MAS4301 - Algebraic Structures
- STA4321 - Introduction to Mathematical Statistics I
- MAT4934 - Senior Mathematics Seminar

Required Courses Part II

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Required Courses Part III

Complete at least 3 of the following courses:

- MAD4203 - Intro Combinatorics
- MAA4402 - Complex Variables
- MTG3212 - College Geometry
- MAS4302 - Topics in Algebraic Structures
- MTG4302 - Topology

Required Courses Part IV

Complete at least 3 of the following courses:

- MAP4401 - Advanced Differential Equations
- MAD3301 - Graph Theory
- MAP3103 - Math Model Appl (Inactive)
- STA4322 - Introduction to Mathematical Statistics II
- MAD3401 - Numerical Analysis
- MHF4302 - Math Logic
- MHF4102 - Axiomatic Set Thry

Additional Science Course with Lab

Students must complete one additional Science Course with Lab from the Common Prerequisites Part II list.

Additional Comments:

Lower Division Requirements

Type
Prerequisite

Common Prerequisite Courses Part I

For a list of all state-approved common prerequisites, including alternatives, visit https://cpm.flvc.org.

Complete ALL of the following Courses:

- MAC2311 - Calculus I
- MAC2312 - Calculus II
- MAC2313 - Multivariable Calc
- MAP2302 - Differential Equations
- COP2210 - Programming I
  OR COP2250 - Java Programming

MAP2302 Differential Equat is not required for Statistics Majors.

Common Prerequisites Part II

Complete at least 1 of the following courses:

- BSC2010 - General Biology I
  AND BSC2010L - General Biology I Lab
- BSC2011 - General Biology II: Diversity of Life, Organismal Structure and Function
  AND BSC2011L - General Biology Lab II
- CHM1045 - General Chemistry I
  AND CHM1045L - General Chemistry Lab I
- CHM1046 - General Chemistry II
  AND CHM1046L - General Chemistry Lab II
- PHY2048 - Physics with Calculus I
  AND PHY2048L - General Physics Laboratory I
- PHY2049 - Physics with Calculus II
  AND PHY2049L - General Physics Laboratory II
- GLY1010 - Physical Geology
  AND GLY1010L - Physical Geology Lab

Additional Comments:

The major in Mathematics – Biology Track gives an opportunity to undergraduate mathematics students interested in biology to be exposed to the interplay between the two disciplines. It also provides a firm mathematical foundation necessary for graduate studies in the life sciences. Courses for this major includes mathematics, statistics, and biology.

Mathematical Sciences Degree Core
Type
Completion Requirement

Mathematics

All students must select at least **three** courses from the core groups (Mathematics and Statistics) as detailed in each major's requirements below.

Fulfill ALL of the following requirements:

Mathematics

Complete ANY of the following Courses:

- MAS3105 - Linear Algebra
- MAA3200 - Intro To Adv Math

AND

Statistics

Complete ANY of the following Courses:

- STA4321 - Introduction to Mathematical Statistics I
- STA4362 - Statistical Machine Learning

Electives

Once students complete their major, the balance of credits necessary for graduation may be chosen from any courses in the University approved by the student's advisor.
Elective Restrictions for the Mathematical Science or Mathematical Data Science Major

The following courses are not acceptable for credit toward graduation, unless a student has passed the course before declaring a Mathematical Science or Mathematical Data Science as a major: MAC2233 Calc For Business,STA2122 Stat for Behav Scien I, STA3123 Stat for Behav Scien II, STA2023 Stat Bus & Eco, and QMB3200 Bus Stats & Analysis I (College of Business).

Elective Restrictions for the Statistics Major

The following courses are not acceptable for credit toward graduation, unless a student has passed the course before declaring a Statistics major: MAC2233 Calc For Business, STA2023 Stat Bus & Eco, STA3033 Prob & Stat For Cs, STA3111 Statistics I, STA3112 Statistics II, STA2122 Stat for Behav Scien I, STA3123 Stat for Behav Scien II, STA3145 Sta Hlth Profession and QMB3200 Bus Stats & Analysis I (College of Business).

Additional Comments:

Major in Mathematics – Applied Math Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAS3105 - Linear Algebra
- MAD2104 - Discrete Mathematics

- MAA3200 - Intro To Adv Math
- STA4321 - Introduction to Mathematical Statistics I
- MAA4211 - Advanced Calculus
- MAD3401 - Numerical Analysis
- MAP4104C - Topics in Mathematical Modeling

Required Courses Part II

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Note: Students wishing to go to graduate school in Mathematical Sciences are strongly advised to take MAA 4402 Complex Variables.

Math Elective List

Complete at least 4 of the following courses:

- MAD4203 - Intro Combinatorics
- MAA4402 - Complex Variables
- MAA4212 - Adv Calculus II
- MAS4301 - Algebraic Structures
- MAS4302 - Topics in Algebraic Structures
- MAP4401 - Advanced Differential Equations
- MAD3301 - Graph Theory
- MAD3512 - Theory of Algorithms
- MAD3512 - Theory of Algorithms
- MHF4102 - Axiomatic Set Thry
- MHF4302 - Math Logic
- MAP4634 - Quantitative Risk Management
- MAS4203 - Number Theory
- MAP4215 - Stochastic Differential Equations
- MAP4315 - Nonlinear Dynamics with Applications to Sciences
- MAP3253 - Mathematical Scientific Computation
- MAP4412 - Introduction to Fourier Analysis
- MAA4504 - Functional Analysis
- MAS4310 - Introduction to Algebraic Geometry
- MTG4254 - Differential Geometry
- MTG4302 - Topology
- STA4322 - Introduction to Mathematical Statistics II

Additional Comments:

The major in Mathematics – Biology Track gives an opportunity to undergraduate mathematics students interested in biology to be exposed to the interplay between the two disciplines. It also provides a firm

mathematical foundation necessary for graduate studies in the life sciences. Courses for this major includes mathematics, statistics, and biology.

Students must fulfill the required courses and complete on of the options below.

Major in Mathematics – Biology Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAS3105 - Linear Algebra
- MAD2104 - Discrete Mathematics
- MAA3200 - Intro To Adv Math
- STA4321 - Introduction to Mathematical Statistics I
- MAD3401 - Numerical Analysis
- MAP4104C - Topics in Mathematical Modeling
- MAP4401 - Advanced Differential Equations
- MAP4315 - Nonlinear Dynamics with Applications to Sciences
- BSC2010 - General Biology I
  AND BSC2010L - General Biology I Lab
- BSC2011 - General Biology II: Diversity of Life, Organismal Structure and Function
  AND BSC2011L - General Biology Lab II
- PCB3063 - Genetics

Required Upper Division Biology Course

One upper division (level 3000 or higher) biology course with the approval of the math advisor

Required Courses Part II

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Options

Fulfill ANY of the following requirements:

Option 1

Complete ALL of the following Courses:

- STA3163 - Statistical Methods I
- STA3164 - Statistical Methods II

OR

Option 2

Complete at least 2 of the following courses:

- STA4234 - Introduction to Regression Analysis
- STA4202 - Introduction to Design of Experiments
- STA4502 - Introduction to Non-parametric Methods

Additional Comments:

Admissions Requirements for the Bachelor of Science (BS) in Mathematical Sciences

See general university admissions requirements at admissions.fiu.edu.

The major in Mathematics – Business Track gives an opportunity to undergraduate mathematics students interested in business and finance to be exposed to the interplay between mathematics and these two disciplines. It also provides a firm mathematical foundation necessary for graduate studies in finance. Courses needed for this major includes mathematics, statistics, economics, and business.

Major in Mathematics - Business Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- ECO2023 - Principles of Microeconomics
- ECO2013 - Principles of Macroeconomics
- MAD2104 - Discrete Mathematics

Required Courses Part II

Complete ALL of the following Courses:

- MAS3105 - Linear Algebra
- MAA3200 - Intro To Adv Math
- STA4321 - Introduction to Mathematical Statistics I
- MAD3401 - Numerical Analysis
- MAP4104C - Topics in Mathematical Modeling
- MAP4634 - Quantitative Risk Management
- MAP4215 - Stochastic Differential Equations
- STA4322 - Introduction to Mathematical Statistics II
- ACG3024 - Introduction to Accounting for Managers and Investors
- FIN3005 - Introduction to Business Finance

Required Courses Part III

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Required Courses Part IV

Complete at least 1 of the following courses:

- ECO3101 - Intermediate Microeconomics
- ECO3202 - Applied Macroeconomics
- ECO3203 - Intermediate Macroeconomics
- ECO3223 - Money and Banking

Additional Comments:

The major in Mathematics – Chemistry Track gives an opportunity to undergraduate mathematics students interested in chemistry to be exposed to the interplay between two disciplines. It also provides a firm mathematical foundation necessary for graduate studies in chemistry and the life sciences. Courses needed for this major include offerings from mathematics, statistics, and chemistry.

Major in Mathematics - Chemistry Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAA3200 - Intro To Adv Math
- MAD2104 - Discrete Mathematics
- MAS3105 - Linear Algebra
- STA4321 - Introduction to Mathematical Statistics I
- MAD3401 - Numerical Analysis
- MAP4104C - Topics in Mathematical Modeling
- MAP4401 - Advanced Differential Equations
- PHY2048 - Physics with Calculus I
  AND PHY2048L - General Physics Laboratory I
- PHY2049 - Physics with Calculus II
  AND PHY2049L - General Physics Laboratory II
- CHM1045 - General Chemistry I
  AND CHM1045L - General Chemistry Lab I
- CHM1046 - General Chemistry II
  AND CHM1046L - General Chemistry Lab II
- CHM2210 - Organic Chemistry I
- CHM3410 - Physical Chemistry I
- CHM3411 - Physical Chemistry II

Required Courses Part II

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Note: Students wishing to pursue a graduate degree in Mathematical Sciences are strongly advised to take MAA4211 Advanced Calculus and MAS4301 Alg Structures. Students wishing to pursue graduate studies in Biochemistry or Bioinformatics will be encouraged to take Biological Chemistry CHM4304 Biol Chemistry I (the Chemistry Department will waive Organic Chemistry CHM2211 Organic Chem II and Quantitative Analysis CHM3120 Intro Analyt Chem).

Additional Comments:

The major in Mathematics – Computer Science Track gives an opportunity to undergraduate mathematics students interested in computer science to be exposed to the interplay between the two disciplines. It also provides a firm mathematical foundation necessary for graduate studies in computer science. Courses needed for this major include offerings from mathematics, statistics, and programming.

Major in Mathematics - Computer Science Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAA3200 - Intro To Adv Math
- MAD2104 - Discrete Mathematics
- MAS3105 - Linear Algebra
- STA4321 - Introduction to Mathematical Statistics I
- MAD3401 - Numerical Analysis
- MAP4104C - Topics in Mathematical Modeling
- MAD3512 - Theory of Algorithms
- COP3337 - Computer Programming II
- COP3530 - Data Structures

Required Courses Part II

Complete at least 1 of the following courses:

- CDA3102 - Computer Architecture
- CDA3103 - Fundamentals of Computer Systems

Required Courses Part III

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math

- MHF4401 - Methods in the History of Modern Mathematics

Required Courses Part IV

Complete at least 1 of the following courses:

- MAD3301 - Graph Theory
- MAP3253 - Mathematical Scientific Computation
- MAA4402 - Complex Variables
- STA4322 - Introduction to Mathematical Statistics II

Required Courses Part V

Complete at least 1 of the following courses:

- COP4338 - Systems Programming
- COP4710 - Database Management
- CAP4770 - Introduction to Data Mining
- COP4534 - Algorithm Techniques
- CAP4710 - Principles of Computer Graphics

Additional Comments:

The major in Mathematics – Economics Track gives an opportunity to undergraduate mathematics students interested in economics to be exposed to the interplay between two disciplines. It also provides a firm mathematical foundation necessary for graduate studies in economics or finance. Courses needed for this major includes mathematics, statistics, and economics.

Major in Mathematics - Economics Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- ECO2013 - Principles of Macroeconomics
- ECO2023 - Principles of Microeconomics
- ECO3101 - Intermediate Microeconomics
- ECO3203 - Intermediate Macroeconomics
- MAD2104 - Discrete Mathematics
- MAA3200 - Intro To Adv Math
- MAD3401 - Numerical Analysis
- MAS3105 - Linear Algebra
- MAP4104C - Topics in Mathematical Modeling
- MAA4211 - Advanced Calculus
- MAP4215 - Stochastic Differential Equations
- STA4321 - Introduction to Mathematical Statistics I
- STA4322 - Introduction to Mathematical Statistics II

Required Courses Part II

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Required Courses Part III

Complete at least 1 of the following courses:

- ECO4400 - Economics of Strategy and Information
- ECO4421 - Introduction to Econometrics
- ECO4933 - Topics In Theory

Additional Comments:

The major in Mathematics – Physics Track gives an opportunity for undergraduate mathematics students interested in physics to be exposed to the interplay between the two disciplines. It also provides a firm mathematical foundation needed for graduate studies in the physical sciences. Courses needed for this major include offerings from mathematics, statistics, and physics.

Major in Mathematics - Physics Track
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAD2104 - Discrete Mathematics
- MAS3105 - Linear Algebra
- MAA3200 - Intro To Adv Math
- MAD3401 - Numerical Analysis
- MAP4104C - Topics in Mathematical Modeling
- MAP4401 - Advanced Differential Equations
- STA4321 - Introduction to Mathematical Statistics I
- PHY3106 - Modern Physics
- PHY3802L - Intermediate Physics Lab

Required Courses Part II

Complete at least 1 of the following courses:

- IDS4174 - Mathematics and Philosophy in Arts
- MHF3404 - History Of Math
- MHF4401 - Methods in the History of Modern Mathematics

Required Courses Part III

(Select any two of the following Course Sequences)

Complete at least 2 of the following:

Course Sequence I

Complete ALL of the following Courses:

- PHY4221 - Introduction to Classical Mechanics
- PHY4222 - Advanced Classical Mechanics

OR

Course Sequence II

Complete ALL of the following Courses:

- PHY4323 - Intermediate Electromagnetism I
- PHY4324 - Intermediate Electromagnetism II

OR

Course Sequence III

Complete ALL of the following Courses:

- PHY4604 - Quantum Mechanics I
- PHY4605 - Quantum Mechanics II

Required Courses Part IV

Complete at least 1 of the following courses:

- MAA4211 - Advanced Calculus
- MAA4402 - Complex Variables
- MAA4504 - Functional Analysis
- MAP4215 - Stochastic Differential Equations
- MAP4315 - Nonlinear Dynamics with Applications to Sciences
- MAP4412 - Introduction to Fourier Analysis
- MAS4301 - Algebraic Structures
- MTG4254 - Differential Geometry
- STA4322 - Introduction to Mathematical Statistics II

Additional Comments:

This undergraduate major in Mathematical Data Science is designed to help prepare Math/Stat students for careers in Data Science, a field rapidly expanding in the private sector. Because computer programming and machine learning are among the primary components of Data Science, most data scientists currently have been trained as computer scientists. Our proposed major will cover a core of programming courses, but complemented by Math and Statistics courses that will make our graduate a useful complementary part of a data science team working in the private sector.

Major in Mathematical Data Science
Type
Completion Requirement

Required Courses Part I

Complete ALL of the following Courses:

- MAS3105 - Linear Algebra
- MAS4107 - Linear Algebra II
  AND MAS4107L - Linear Algebra II Lab
- MAD2104 - Discrete Mathematics
- STA4321 - Introduction to Mathematical Statistics I
- STA4322 - Introduction to Mathematical Statistics II
- STA4234 - Introduction to Regression Analysis
- MAP4202 - Optimization
  AND MAP4202L - Optimization Lab
- STA4362 - Statistical Machine Learning
  AND STA4362L - Statistical Machine Learning Lab
- MAP4950C - Senior Design Project for Mathematical Data Science

Required Courses Part II

Complete ALL of the following Courses:

- COP2210 - Programming I
- CAP2752 - Data Science for All
- COP3337 - Computer Programming II
- COP3530 - Data Structures
- COP4710 - Database Management

Additional Comments:

The Statistics major is designed to teach students how to collect, analyze, and interpret data. Graduating students will have the necessary job skills for employment in a variety of fields. However, the courses are rigorous so that students are well prepared to pursue a graduate degree in statistics.

Major in Statistics
Type
Completion Requirement

Required Courses

Complete ALL of the following Courses:

- MAS3105 - Linear Algebra
- STA3163 - Statistical Methods I
- STA3951 - Oral Presentations in Statistics

- STA4321 - Introduction to Mathematical Statistics I
- STA4322 - Introduction to Mathematical Statistics II
- STA4202 - Introduction to Design of Experiments
- STA4234 - Introduction to Regression Analysis
- STA4664 - Stat Quality Control
- ENC3213 - Professional and Technical Writing

Additional Required Courses

Six additional credit hours of approved statistics courses. Three additional credit hours in an approved statistics, mathematics, or computer science course.
A grade of 'C' or higher in each of these courses is necessary for the major.

Additional Comments:

Other Curricular Offering: Combined BS in Mathematical Sciences to MS in Mathematical Sciences Accelerated Degree Pathway
Type
Completion Requirement

Required Courses

This pathway will allow strong students in mathematics to complete a bachelor's degree and a master's degree in 5 years rather than the usual six. A minimum of 140 credits are required for graduation with both the bachelor's and the master's degree. In addition to fulfilling the requirements for the Bachelor's degree in mathematics, these 140 credits include 30 graduate credits required for the Masters of Science in Mathematical Sciences. A maximum of ten (10) graduate mathematics credits can be concurrently used toward the bachelor's and master's degrees.

The graduate courses distribution should follow catalog descriptions of the master's program requirements. Students must take at least 3 courses from List 1 (below) and at least 3 courses from List 2 (below). The balance of the 140 semester hours required for graduation may be chosen from any courses in the university, a minimum of6 of these should be at the upper division level or higher.

Fulfill ALL of the following requirements:

Required Courses: Years 1 and 2

Complete ALL of the following Courses:
- MAC2311 - Calculus I
- MAC2312 - Calculus II
- MAC2313 - Multivariable Calc
- MAS3105 - Linear Algebra
- MAP2302 - Differential Equations

AND

Required Courses: Year 3

Fulfill ALL of the following requirements:

Year 3 Fall Courses

Complete ALL of the following Courses:

- MAA3200 - Intro To Adv Math
- STA4321 - Introduction to Mathematical Statistics I

AND

Year 3 Spring Courses

Complete ALL of the following Courses:

- MAA4211 - Advanced Calculus
- MAS4301 - Algebraic Structures

AND

Year 3 Summer Courses

One course from List 1 Electives or List 2 Electives (shown below), and 1 graduate course

AND

Year 4 Required Courses

Fulfill ALL of the following requirements:

Year 4 Fall Courses: Part 1

Complete ALL of the following Courses:

- MAA6616 - Real Analysis

AND

Year 4 Fall Courses: Part 2

One course from List 1 Electives or List 2 Electives (shown below)

AND

Year 4 Fall Courses: Part 3

Senior Seminar (1 credit)

AND

Year 4 Spring Courses: Part 1

One graduate course

AND

Year 4 Spring Courses: Part 2

Two courses from List 1 Electives or List 2 Electives (shown below)

AND

Year 4 Summer Courses

Three graduate credits

AND

Year 5 Required Courses

Fulfill ALL of the following requirements:

Year 5 Fall Courses

Nine graduate credits

AND

Year 5 Spring Courses

Nine graduate credits

List 1 Electives

Complete at least 3 of the following courses:

- MAD4203 - Intro Combinatorics
- MAA4402 - Complex Variables
- MTG3212 - College Geometry
- MAS4203 - Number Theory
- MAA4212 - Adv Calculus II
- MAS4302 - Topics in Algebraic Structures
- MTG4302 - Topology

List 2 Electives

Complete at least 3 of the following courses:

- MAP4401 - Advanced Differential Equations
- MAD3301 - Graph Theory
- STA4322 - Introduction to Mathematical Statistics II
- MAD3401 - Numerical Analysis

- MHF4302 - Math Logic
- MHF4102 - Axiomatic Set Thry

Additional Comments:

Admissions Requirements for the Combined BS in Mathematical Sciences to Master of Science (MS) in Mathematical Sciences Accelerated Degree Pathway

To be considered for admission to the combined bachelor's/master's degree pathway, students must have completed at least 75 credits in the bachelor's degree program at FIU and meet the admissions criteria for the graduate degree program to which they are applying. Students need only apply once to the combined degree pathway, but the application must be submitted to Graduate Admissions before the student starts the last 30 credits of the bachelor's degree program. A student admitted to the combined degree pathway will be considered to have undergraduate status until the student applies for graduation from their bachelor's degree program. Upon conferral of the bachelor's degree, the student will be granted graduate status and be eligible for graduate assistantships. Only 5000-level or higher courses, and no more than the number of credits specified by the program catalog, may be applied toward both degrees.

Admission Requirements

(1) Current enrollment in a Bachelor's degree program in mathematics.

(2) Current overall GPA of at least 3.2 and GPA of at least 3.2 in upper division courses.

(3) Completion of 75-90 undergraduate credit-hours.

(4) Verbal and Quantitative GRE scores with a minimum of 151 in the quantitative portion before entering the MS phase of the program.

(5) Approval of the graduate committee.