Twin Cities Campus

Mathematics B.A.

School of Mathematics

College of Liberal Arts

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2018
- Required credits to graduate with this degree: 120
- Required credits within the major: 44 to 82
- Degree: Bachelor of Arts

The mission of the program is to provide high-quality mathematics instruction in a stimulating intellectual atmosphere. The goal is to educate students at all levels to provide cultural enrichment, to give them the analytic tools they need to become responsible citizens, and to prepare them for careers involving mathematics.

The School of Mathematics offers a program in the College of Liberal Arts leading to a bachelor of arts degree. The course of study is flexible and may be adapted to satisfy a wide variety of interests and needs. Students may prepare for graduate study in mathematics or may emphasize various fields of interest, such as preparation for secondary school teaching, actuarial science, or programs in applied mathematics. This includes industrial mathematics, biology, mathematics applicable to computer science, and numerical analysis.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

Students must complete 3 courses before admission to the program.

Successful completion of Calculus I (1271/1371/1571H), plus Calculus II (1272/1372/1572H), plus one 2xxx level Calculus course: (2243/2373/2574H/3592H) or (2263/2374/2573H/3593H). See equivalent course lists below.

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

Required prerequisites

Required Calculus Courses

Both Calculus I & II plus one 2xxx (or 3xxx level Honors) Calculus course must be successfully completed in order to declare the Math major.

Calculus Sequence

Calculus I

MATH 1271 - Calculus I [MATH] (4.0 cr)
or MATH 1371 - CSE Calculus I [MATH] (4.0 cr)
or MATH 1571H - Honors Calculus I [MATH] (4.0 cr)

Calculus II

MATH 1272 - Calculus II (4.0 cr)
or MATH 1372 - CSE Calculus II (4.0 cr)
or MATH 1572H - Honors Calculus II (4.0 cr)

2xxx Level Calculus Course

MATH 2243 - Linear Algebra and Differential Equations (4.0 cr)
or MATH 2373 - CSE Linear Algebra and Differential Equations (4.0 cr)
or **2xxx or 3xxx Level Honors Calculus Course**
MATH 2574H - Honors Calculus IV (4.0 cr)
or MATH 3592H - Honors Mathematics I (5.0 cr)

General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

Program Requirements

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Students are required to take 4 semester(s) of any second language.

CLA BA degrees require 4 semesters or the equivalent of a second language.

CLA degrees require students to complete 48 credits of upper division coursework taken at the 3xxx, 4xxx, or 5xxx level. For a BA at least 18 of the 48 upper division credits must be outside of the major. For some specific majors, there are exceptions to this requirement.

This program requires 18 upper division credits outside the major. See your advisor for a list of courses that can or cannot be used to meet this requirement.

Students must complete a minimum of 6 upper division math courses at 4xxx or above and a senior project (4995 or 4997W). Please note that MATH 3113, 3116, 3118, 4116, 4118, 3283W, 4005, 4067W, 49xx and 59xx math courses do not satisfy upper division mathematics course requirements.

The School of Mathematics will accept STAT 5101 and STAT 5102 as part of the upper division mathematics course requirements. The content of STAT 5101 is the same as MATH 5651, and only one of these courses may be taken, not both. STAT 5102 does not fulfill the analysis requirement. No other courses from other departments may be used as part of the mathematics major course requirements.

In addition to the specializations described below, students who wish to pursue a pure mathematics track, or are planning to go to graduate school in mathematics, should consult their advisor about appropriate course choices.

CLA freshman must complete the First Year Experience course sequence.

Remaining Required Lower Division Calculus Courses

Multivariable Calculus

MATH 2263 - Multivariable Calculus (4.0 cr)
or MATH 2374 - CSE Multivariable Calculus and Vector Analysis (4.0 cr)
or **2xxx or 3xxx Level Honors Calculus Course**
MATH 2573H - Honors Calculus III (4.0 cr)
or MATH 3593H - Honors Mathematics II (5.0 cr)

Sequences, Series, and Foundations

MATH 3283W - Sequences, Series, and Foundations: Writing Intensive [WI] (4.0 cr)
or MATH 2283 *{Inactive}*(3.0 cr)

Senior Project

Students should consult with a mathematics advisor prior to beginning the senior year to determine possible topic and possible faculty mentor for the senior project.
MATH 4997W - Senior project (Writing Intensive) [WI] (1.0 cr)
or MATH 4995 - Senior Project for CLA (1.0 cr)

Upper Division Writing Intensive within the major

Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other major requirements.
Take 0 - 1 course(s) from the following:
•MATH 3283W - Sequences, Series, and Foundations: Writing Intensive [WI] (4.0 cr)
•MATH 4067W - Actuarial Mathematics in Practice [WI] (3.0 cr)
•MATH 4997W - Senior project (Writing Intensive) [WI] (1.0 cr)

Mathematics Options

Mathematics (No Specialization)

Students who do not choose one of the specializations must complete the basic mathematics course requirements listed here.
Take 6 or more course(s) including 3 or more sub-requirements(s) from the following:

Algebra Requirement

Both courses can be from the theoretical algebra list.
Take 2 or more course(s) from the following:

Theoretical Algebra

Take 1 or more course(s) from the following:
•MATH 4281 - Introduction to Modern Algebra (4.0 cr)
•MATH 5248 - Cryptology and Number Theory (4.0 cr)
•MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
•MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
•MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)

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- MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)

•Applied Algebra

Take 0 or more course(s) from the following:

- MATH 4242 - Applied Linear Algebra (4.0 cr)
- MATH 5705 - Enumerative Combinatorics (4.0 cr)
- MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)
- MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)
- MATH 5485 - Introduction to Numerical Methods I (4.0 cr)

•Analysis Requirement

Take 2 or more course(s) from the following:

- MATH 4567 - Applied Fourier Analysis (4.0 cr)
- MATH 4603 - Advanced Calculus I (4.0 cr)
- MATH 4604 - Advanced Calculus II (4.0 cr)
- MATH 5486 - Introduction To Numerical Methods II (4.0 cr)
- MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)
- MATH 5535 - Dynamical Systems and Chaos (4.0 cr)
- MATH 5583 - Complex Analysis (4.0 cr)
- MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)
- MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)
- MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
- MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
- MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
- MATH 5654 - Prediction and Filtering (4.0 cr)
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)

or STAT 5101 - Theory of Statistics I (4.0 cr)

•4xxx/5xxx Level Mathematics Electives Requirement

Courses from the algebra and analysis lists which have not already taken to fulfill those requirements may be taken to fulfill the electives requirement.

Take 2 or more course(s) from the following:

- MATH 4xxx
- MATH 5xxx
- STAT 5102 - Theory of Statistics II (4.0 cr)

-OR-

Actuarial Science Specialization

Complete the requirements for the actuarial science subplan.

-OR-

Mathematics Education Specialization

Complete the requirements for the mathematics education subplan.

-OR-

Computer Applications Specialization

Complete the requirements for the computer applications subplan.

-OR-

Mathematical Biology: Genomics

Complete the requirements for the genomics subplan.

-OR-

Mathematical Biology: Physiology

Complete the requirements for the physiology subplan.

Program Sub-plans

A sub-plan is not required for this program.

Actuarial Science

The BA mathematics with actuarial specialization requires a minimum of 7 upper division (4xxx level and above) mathematics courses, as indicated in the lists below. Students pursuing the actuarial specialization may want to include MATH 4067W, which fulfills an upper division writing intensive requirement, although it does not fulfill any of the upper division mathematics course requirements. It is recommended that students in this specialization should plan for a summer internship after junior year.

Mathematics Courses for the Actuarial Specialization

Algebra Requirements

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Theoretical Algebra
Take 1 or more course(s) from the following:
- MATH 4281 - Introduction to Modern Algebra (4.0 cr)
- MATH 5248 - Cryptology and Number Theory (4.0 cr)
- MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
- MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
- MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)
- MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)

Applied Algebra
MATH 4242 - Applied Linear Algebra (4.0 cr)

Analysis Requirements for Actuarial Specialization

Probability and Statistics
Theory of Probability & Statistics
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
or STAT 5101 - Theory of Statistics I (4.0 cr)
MATH 5652 - Introduction to Stochastic Processes (4.0 cr)

Actuarial Mathematics Courses
MATH 4065 - Theory of Interest (4.0 cr)
MATH 5067 - Actuarial Mathematics I (4.0 cr)
MATH 5068 - Actuarial Mathematics II (4.0 cr)

Computer Science Requirement
CSCI 1103 - Introduction to Computer Programming in Java (4.0 cr)
or CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)
or CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)

Economics and Business Course Requirements

Introductory Economics
ECON 1101 - Principles of Microeconomics [SOCS, GP] (4.0 cr)
ECON 1102 - Principles of Macroeconomics (4.0 cr)

Economics and Finance
ACCT 2051 - Introduction to Financial Reporting (4.0 cr)
ECON 3101 - Intermediate Microeconomics (4.0 cr)
ECON 4261 - Introduction to Econometrics (4.0 cr)
FINA 3001 - Finance Fundamentals (3.0 cr)

Insurance
Take 2 or more course(s) from the following:
- INS 4105 - Corporate Risk Management (2.0 cr)
- INS 4101 - Employee Benefits (2.0 cr)
- INS 4205 - Insurance Theory and Practice (2.0 cr)

Computer Applications

A minimum of six upper division (4xxx level and above) Mathematics courses and a minimum of two upper division computer science courses (plus lower division prerequisites) from the courses indicated below are needed to fulfill the requirements for the computer applications specialization. Students who complete the computer applications specialization also meet requirements for a minor in computer science.

Algebra Requirements

Theoretical Algebra
MATH 4281 - Introduction to Modern Algebra (4.0 cr)
or MATH 5248 - Cryptology and Number Theory (4.0 cr)
or MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
or MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
or MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)
or MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)

Applied Algebra
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)

Analysis Requirements

Numerical Methods
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)

Additional Analysis Course
MATH 4567 - Applied Fourier Analysis (4.0 cr)
or MATH 4603 - Advanced Calculus I (4.0 cr)
or MATH 4604 - Advanced Calculus II (4.0 cr)
or MATH 5535 - Dynamical Systems and Chaos (4.0 cr)
or MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)
or MATH 5583 - Complex Analysis (4.0 cr)
or MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)

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or MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)
or MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
or MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
or MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
or MATH 5654 - Prediction and Filtering (4.0 cr)
or MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
or STAT 5101 - Theory of Statistics I (4.0 cr)

Additional Computing-Related Mathematics

Mathematical Logic

MATH 5165 - Mathematical Logic I (4.0 cr)

Computer-Related Mathematics Electives

MATH 4242 - Applied Linear Algebra (4.0 cr)
or MATH 5166 *{Inactive}*(4.0 cr)
or MATH 5248 - Cryptology and Number Theory (4.0 cr)
or MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
or MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
or MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)
or MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)
or MATH 5705 - Enumerative Combinatorics (4.0 cr)
or MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)
or MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)

Computer Applications Prerequisite Requirements

Introduction to Computing and Programming Concepts

CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)
CSCI 1933 - Introduction to Algorithms and Data Structures (4.0 cr)

or **Introduction to Computer Programming**

CSCI 1913 - Introduction to Algorithms, Data Structures, and Program Development (4.0 cr)
CSCI 1103 - Introduction to Computer Programming in Java (4.0 cr)
or CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)

CSCI 2011 - Discrete Structures of Computer Science (4.0 cr)

Upper Division Computer Science Courses

Take 2 or more course(s) from the following:

- CSCI 4011 - Formal Languages and Automata Theory (4.0 cr)
- CSCI 4041 - Algorithms and Data Structures (4.0 cr)
- CSCI 4511W - Introduction to Artificial Intelligence [WI] (4.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Machine Learning Fundamentals (3.0 cr)

Mathematics Education

Six upper division (4xxx level and above) mathematics courses are required for the mathematics education specialization. These courses prepare students to meet admission requirements for the secondary teaching licensure program in mathematics. The topics covered by these courses include theoretical and applied algebra-combinatorics, probability, mathematical analysis, and geometry. Students can take MATH 5651 or STAT 5101, not both. MATH 5651/STAT 5101 can fulfill both the probability and statistics requirement as well as serving as one the analysis requirement courses.

Mathematics Education Specialization Requirements

Theoretical Algebra

MATH 4281 - Introduction to Modern Algebra (4.0 cr)
or MATH 5248 - Cryptology and Number Theory (4.0 cr)
or MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
or MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)

Applied Algebra: Combinatorics

Note: MATH 4707 fulfills the Applied Algebra requirement only for the Mathematics Education Specialization.
MATH 4707 - Introduction to Combinatorics and Graph Theory (4.0 cr)
or MATH 5705 - Enumerative Combinatorics (4.0 cr)
or MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)

Geometry

MATH 5335 - Geometry I (4.0 cr)

Probability and Statistics

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MATH 5651/STAT 5101 may be used to fulfill this requirement.
MATH 4653 - Elementary Probability (4.0 cr)

Analysis Requirements

MATH 5651 (or STAT 5101) can fulfill the probability and statistics requirement as well as being one of the analysis requirement courses.
Take 2 or more course(s) from the following:
- MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
- MATH 4567 - Applied Fourier Analysis (4.0 cr)
- MATH 4603 - Advanced Calculus I (4.0 cr)
- MATH 4604 - Advanced Calculus II (4.0 cr)
- MATH 5486 - Introduction To Numerical Methods II (4.0 cr)
- MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)
- MATH 5535 - Dynamical Systems and Chaos (4.0 cr)
- MATH 5583 - Complex Analysis (4.0 cr)
- MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)
- MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)
- MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
- MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
- MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
- MATH 5654 - Prediction and Filtering (4.0 cr)

Mathematics Elective

If a sixth mathematics course is needed after requirements for this specialization have been met, a course from either the algebra or analysis lists or another standard 4xxx or 5xxx level course may be taken.
Take 0 or more course(s) from the following:
- MATH 4xxx
- MATH 5xxx
- STAT 5102 - Theory of Statistics II (4.0 cr)

Mathematical Biology: Genomics

A minimum of six upper division (4xxx level and above) mathematics courses and a minimum of three upper division courses in related areas (plus lower division prerequisites) are needed to fulfill the requirements for the specialization in mathematical biology: genomics. Note that some genomics elective choices have additional prerequisite courses.

Mathematics Requirements for MathBio - Genomics

Mathematical Modeling

MATH 4428 - Mathematical Modeling (4.0 cr)

Theoretical Algebra

Take 1 or more course(s) from the following:
- MATH 4281 - Introduction to Modern Algebra (4.0 cr)
- MATH 5248 - Cryptology and Number Theory (4.0 cr)
- MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
- MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
- MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)
- MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)

Applied Algebra

MATH 4242 - Applied Linear Algebra (4.0 cr)

Analysis Requirements

Genomics Analysis Requirement

Take 1 or more course(s) from the following:
- MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)
- MATH 5535 - Dynamical Systems and Chaos (4.0 cr)

Theory of Probability & Statistics I

MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
or STAT 5101 - Theory of Statistics I (4.0 cr)

Mathematics Elective

If MATH 5445 not is chosen as the Genomics Elective course, then a sixth upper division Mathematics course is needed for this specialization. A course from either the Algebra or Analysis lists or another standard 4xxx or 5xxx level course may be taken to fulfill this requirement for the major.
Take 0 or more course(s) from the following:
- MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)
- MATH 4xxx
- MATH 5xxx

Genomics, Computer Science Requirements

Computer Science for Genomics

CSCI 1133, 1933, 2011 plus 4041 may serve as the substitute prerequisite for CSCI 5461.
CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)

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CSCI 3003 - Introduction to Computing in Biology (3.0 cr)
or **Computational Techniques for Genomics**
CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
CSCI 4041 - Algorithms and Data Structures (4.0 cr)
CSCI 2011 - Discrete Structures of Computer Science (4.0 cr)
CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)
CSCI 1933 - Introduction to Algorithms and Data Structures (4.0 cr)

Genomics, Biology Requirements

If the genomics elective course chosen does not require a chemistry sequence, then it is still recommended that one semester of chemistry is taken (CHEM 1061 & CHEM 1065 Lab) which will also fulfill the physical sciences liberal education degree requirement.

1xxx Level Biology Requirement

BIOL 1009H may be substituted.
BIOL 1009 - General Biology [BIOL] (4.0 cr)

Genetics Requirement

GCD 3022 - Genetics (3.0 cr)

Genomics Elective Requirement

The 5xxx level CSCI course which was not taken to fulfill the computer science requirement may (with its prerequisites) be used to fulfill the genomics elective requirement.
Take 1 or more course(s) from the following:
•EEB 5042 - Quantitative Genetics (3.0 cr)
•GCD 4143 - Human Genetics and Genomics (3.0 cr)
•MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)
•**Plant Genomics**
PBIO 5301 has these additional prerequisite courses: CHEM 1061, CHEM 1065 (lab), CHEM 1062, CHEM 1066 (lab), CHEM 2301; BIOC 3021.
•PMB 5301 *{Inactive}*(3.0 cr)
•**Molecular Biology of Cancer**
GCD 4151 has these additional prerequisite courses: CHEM 1061, CHEM 1065 (lab), CHEM 1062, CHEM 1066 (lab), CHEM 2301; BIOC 3021; BIOL 4003.
•GCD 4151 - Molecular Biology of Cancer (3.0 cr)

Mathematical Biology: Physiology

A minimum of six upper division (4xxx level and above) mathematics courses and a minimum of three upper division courses in related areas (plus lower division prerequisites) are needed to fulfill the requirements for the specialization in mathematical biology: physiology. Note that some physiology elective choices have additional prerequisite courses.

Mathematics Requirements for MathBio: Physiology

Mathematical Modeling Requirement
MATH 4428 - Mathematical Modeling (4.0 cr)

Biological Networks or Neuroscience
MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)
or MATH 5447 - Theoretical Neuroscience (4.0 cr)

Theoretical Algebra
Take 1 or more course(s) from the following:
•MATH 4281 - Introduction to Modern Algebra (4.0 cr)
•MATH 5248 - Cryptology and Number Theory (4.0 cr)
•MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
•MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
•MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)
•MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)

Applied Algebra
MATH 4242 - Applied Linear Algebra (4.0 cr)

Analysis Requirements

Physiology Analysis Requirement
Take 1 or more course(s) from the following:
•MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)
•MATH 5535 - Dynamical Systems and Chaos (4.0 cr)

Theory of Probability & Statistics
MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
or STAT 5101 - Theory of Statistics I (4.0 cr)

Physiology, Biology, Chemistry Requirements

1xxx Level Biology Requirement
BIOL 1009H may be substituted.
BIOL 1009 - General Biology [BIOL] (4.0 cr)

Physiology Requirement
PHSL 3061 - Principles of Physiology (4.0 cr)

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Physics Prerequisites

1xxx Level Physics

Phys 1301W & 1302W may be substituted.
PHYS 1201W *{Inactive}*[PHYS, WI] (5.0 cr)
PHYS 1202W *{Inactive}*[PHYS, WI] (5.0 cr)

1xxx Level Chemistry Requirements

CHEM 1061 - Chemical Principles I [PHYS] (3.0 cr)
CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
CHEM 1062 - Chemical Principles II [PHYS] (3.0 cr)
CHEM 1066 - Chemical Principles II Laboratory [PHYS] (1.0 cr)

Physiology Electives

Whichever course - MATH 5445 or MATH 5447 - was not taken to fulfill the mathematics requirement can be taken to fulfill this elective requirement.
Take 1 or more course(s) from the following:
•PHSL 4702 - Cell Physiology (3.0 cr)
•PHSL 5444 - Muscle (3.0 cr)
•NSC 5202 has additional prerequisite courses: CHEM 2301, BIOC 3021, NSCI 3101, NSCI 3102.
•NSC 5202 - Theoretical Neuroscience: Systems and Information Processing (3.0 cr)

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