New Tracks in B.S. in Mathematics

The University has approved the introduction of several tracks in the BS degree in Math. Starting Fall 2015, there will be a Comprehensive Track; an Applied Math Track; a Biology Track; a Chemistry Track; a Computer Science Track; and an Economics Track. Description and requirements of the new program are described below.

Common Prerequisites for all tracks

MAC 2311     Calculus I (4)
MAC 2312     Calculus II (4)
MAC 2313     Calculus III (4)
MAP 2302     Differential Equations (3)
COP 2210      Introduction to Programming  or  COP 2250  Java Programming (3)

Completion of one of the following courses with labs:

BSC 1010       General Biology I (3)
BSC 1010L      General Biology Lab I (1)
BSC 1011       General Biology II (3)
BSC 1011L      General Biology Lab II (1)
CHM 1045       General Chemistry I (3)
CHM 1045L      General Chemistry Lab I (1)
CHM 1046       General Chemistry II (3)
CHM 1046L      General Chemistry Lab II (1)
PHY 2048       Physics with Calculus I (4)
PHY 2048L      Physics with Calculus Lab I (1)
PHY 2049       Physics with Calculus II (4)
PHY 2049L      Physics with Calculus Lab II (1)

Students must choose one of the following tracks:

• COMPREHENSIVE TRACK

The Bachelor of Science 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 track 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, mathematics education.
Courses required for the degree:
Completion of one additional science course with lab from previous list, and

Required courses:
MAD 2104  Discrete Math (3)
MAS 3105  Linear Algebra (3)
MAA 3200  Introduction to Advanced Mathematics (3)
MAA 4211  Advanced Calculus (3)
MAS 4301  Algebraic Structures (3)
STA 4321  Mathematical Statistics (3)
MAT 4934  Senior Seminar (1)

In addition, three courses from each of the following lists

List 1
MAD 4203  Introduction to Combinatorics (3)
MAA 4402  Complex Variables (3)
MTG 3212  College Geometry (3)
MAS 4213  Number Theory (3)
MAA 4212  Topics in Advanced Calculus (3)
MAS 4302  Topics in Algebraic Structures (3)
MTG 4302  Topology (3)

List 2
MAP 4401  Advanced Differential Equations (3)
MAD 3305  Graph Theory (3)
MAP 3103  Mathematical Modeling (3)
STA 4322  Mathematical Statistics II (3)
MAD 3401  Numerical Analysis (3)
MHF 4302  Mathematical Logic (3)
MHF 4102  Axiomatic Set Theory (3)

Electives
The balance of the 60 semester hour requirement for graduation may be chosen from any
courses in the University approved by the student’s advisor.
Remarks: The following courses are not acceptable for credit toward graduation, unless
a student has passed the course before declaring a Mathematics major: MAC 2233, STA 1013, STA 2122, STA 3123, STA 2023, and QMB 3200 (College of Business Administration).
**APPLIED MATH TRACK**

The *Bachelor of Science in Mathematics: Applied Math Track* compared with the Comprehensive Track, less foundational and more application oriented. This track will prepare students for graduate studies in applied mathematics 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, mathematics education.

**Required courses:**
- MAS 3105 Linear Algebra (3)
- MAD 2104 Discrete Math (3)
- MAA 3200 Introduction to Advanced Mathematics (3)
- STA 4321 Mathematical Statistics (3)
- MAA 4211 Advanced Calculus (3)
- MAD 3401 Numerical Analysis (3)
- MAP 4XXX Mathematical Modeling with Lab (4)

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

Four courses from the Math Elective List

**MATH ELECTIVE LIST**
- MAD 4203 Introduction to Combinatorics (3)
- MAA 4402 Complex Variables (3)
- MAA 4212 Topics in Advanced Calculus (3)
- MAS 4301 Algebraic Structures (3)
- MAS 4302 Topics in Algebraic Structures (3)
- MAP 4401 Advanced Differential Equations (3)
- MAD 3305 Graph Theory (3)
- STA 4322 Mathematical Statistics II (3)
- MAD 3512 Theory of Algorithms (3)
- MHF 4102 Axiomatic Set Theory (3)
- MHF 4302 Mathematical Logic (3)
- MAP 4634 Quantitative Risk Management (3)
- MAS 4203 Number Theory (3)
- MAP 4XXX Stochastic Differential Equations (3)
- MAP 4XXX Dynamical Systems (3)
- MAP 4XXX Mathematical Scientific Computation (3)
- MAP 4412 Fourier Analysis (3)
- MAA 4504 Functional Analysis (3)
- MAS 4310 Introduction to Algebraic Geometry (3)
- MTG 4254 Differential Geometry (3)
- MTG 4302 Topology (3)
Electives
The balance of the 60 semester hour requirement for graduation may be chosen from any courses in the University approved by the student’s advisor.
Remarks: The following courses are not acceptable for credit toward graduation, unless a student has passed the course before declaring a Mathematics major: MAC 2233, STA 1013, STA 2122, STA 3123, STA 2023, and QMB 3200 (College of Business Administration).

• BIOLOGY TRACK

The Bachelor of Science 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 needed for this track includes mathematics, statistics, and biology

Required courses:
MAS 3105 Linear Algebra (3)
MAD 2104 Discrete Math (3)
MAA 3200 Introduction to Advanced Mathematics (3)
STA 4321 Mathematical Statistics I (3)
MAD 3401 Numerical Analysis (3)
MAP 4XXX Mathematical Modeling with Lab (4)
MAP 4401 Advanced Differential Equations (3)
MAP 4XXX Dynamical Systems (3)
STA 4322 Mathematical Statistics II (3)
BSC 1010 General Biology I (3)
BSC 1010L General Biology Lab I (1)
BSC 1011 General Biology II (3)
BSC 1011L General Biology Lab II (1)
PCB 3063 Genetics (3)
One upper division biology course with the approval of the math advisor

One of the following two options
Option 1
STA 3163 Statistical Methods I (3)
STA 3164 Statistical Methods II (3)

Option 2: Two courses among the following
STA 4234 Introduction to Regression Analysis (3)
STA 4202 Introduction to Design of Experiments (3)
STA 4502 Introduction to Non-Parametric Methods (3)

Electives
The balance of the 60 semester hour requirement for graduation may be chosen from any courses in the University approved by the student’s advisor.
Remarks: The following courses are not acceptable for credit toward graduation, unless a student has passed the course before declaring a Mathematics major: MAC 2233, STA 1013, STA 2122, STA 3123, STA 2023, and QMB 3200 (College of Business Administration)

- CHEMISTRY TRACK

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

**Required courses:**

- MAA 3200 Introduction to Advanced Mathematics (3)
- MAD 2104 Discrete Math (3)
- STA 4321 Mathematical Statistics I (3)
- MAD 3401 Numerical Analysis (3)
- MAP 4XXX Mathematical Modeling with Lab (4)
- MAP 4401 Advanced Differential Equations (3)
- PHY 2048 Physics with Calculus I (4)
- PHY 2048L Physics with Calculus Lab I (1)
- PHY 2049 Physics with Calculus II (4)
- PHY 2049L Physics with Calculus Lab II (1)
- CHM 1045 General Chemistry I (3)
- CHM 1045L General Chemistry Lab I (1)
- CHM 1046 General Chemistry II (3)
- CHM 1046L General Chemistry Lab II (1)
- CHM 2210 Organic Chemistry I (4)
- CHM 3410 Physical Chemistry I (4)
- CHM 3411 Physical Chemistry II (4)

**And: one course from the following list:**

- MAP 4XXX Mathematical Scientific Computation (3)
- MAA 4402 Complex Variable (3)
- STA 4322 Mathematical Statistics II (3)

*Note: Students wishing to pursue a graduate degree in Mathematical Sciences are strongly advised to take MAA 4211 and MAS 4301. Students wishing to pursue graduate studies in Biochemistry or Bioinformatics will be encouraged to take Biological Chemistry CHM 4304 (the Chemistry Department will waive Organic Chemistry II CHM 2211 and Quantitative Analysis CHM 3120)
**COMPUTER SCIENCE TRACK**

The *Bachelor of Science in Mathematics: Computer Science track* gives an opportunity to undergraduate mathematics students interested in computer sciences 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 track include offerings from mathematics, statistics, and programming.

**Required courses:**

- **MAA 3200**  Introduction to Advanced Mathematics (3)
- **MAD 2104**  Discrete Math (3)
- **MAS 3105**  Linear Algebra (3)
- **STA 4321**  Mathematical Statistics I (3)
- **MAD 3401**  Numerical Analysis (3)
- **MAP 4XXX**  Mathematical Modeling with Lab (4)
- **MAD 3512**  Theory of Algorithms (3)
- **COP 3337**  Computer Programming II (3)
- **COP 3530**  Data Structures (3)
- **CDA 3103**  Fundamentals of Computer Systems (3)

**And: one course from the following list:**

- **MAP 4XXX**  Mathematical Scientific Computation (3)
- **MAA 4402**  Complex Variable (3)
- **STA 4322**  Mathematical Statistics II (3)

**And: One course from the following list**

- **COP 4338**  Programming III (3)
- **COP 4710**  Databases (3)
- **CAP 4770**  Data Mining (3)
- **COP 4534**  Algorithm Design Techniques (3)
- **CAP 4710**  Graphics (3)

**Electives**

The balance of the 60 semester hour requirement for graduation may be chosen from any courses in the University approved by the student’s advisor.
**ECONOMICS TRACK**

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

**Required courses:**

- MAS 3105 Linear Algebra (3)
- MAD 2104 Discrete Math (3)
- MAA 3200 Introduction to Advanced Mathematics (3)
- STA 4321 Mathematical Statistics I (3)
- MAD 3401 Numerical Analysis (3)
- MAP 4XXX Mathematical Modeling with Lab (4)
- MAA 4211 Advanced Calculus (3)
- MAP 4XXX Stochastic Differential Equations (3)
- STA 4322 Mathematical Statistics II (3)
- ECO 2023 Principles of Microeconomics (3)
- ECO 2013 Principles of Macroeconomics (3)
- ECO 3101 Intermediate Microeconomics (3)
- ECO 3203 Intermediate Macroeconomics (3)

**And: One course from the following list**

- ECO 4400 Economics of Strategy and Information (3)
- ECO 4421 Introduction to Econometrics (3)
- ECO 4933 Special Topics (3)

**Electives**

The balance of the 60 semester hour requirement for graduation may be chosen from any courses in the University approved by the student’s advisor.

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