# DEPARTMENT OF MATHEMATICS

## MATHEMATICS BACHELOR OF ARTS

### CLASS OF 2022

### CONCENTRATION IN PURE MATHEMATICS

<table>
<thead>
<tr>
<th>TERM 1</th>
<th>TERM 2</th>
<th>TERM 3</th>
<th>TERM 4</th>
<th>TERM 5</th>
<th>TERM 6</th>
<th>TERM 7</th>
<th>TERM 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 150A (GE B.4) 4 units</td>
<td>MATH 150B 4 units</td>
<td>MATH 250A 4 units</td>
<td>MATH 250B 4 units</td>
<td>MATH 302 3 units</td>
<td>MATH 350 3 units</td>
<td>MATH 414 3 units</td>
<td>MATH 450 3 units</td>
</tr>
<tr>
<td>CNSM 101 (Cognate I ^a) 3 units</td>
<td>MATH 107 (Cognate II ^b) 4 units</td>
<td>MATH 180 or Math 210 (Cognate III ^b) 3 units</td>
<td>MATH 280 3 units</td>
<td>MATH 307 3 units</td>
<td>MATH 407 or Math 430 3 units</td>
<td>MATH 425 or Math 471 3 units</td>
<td>MATH 412 or Math 430 3 units</td>
</tr>
<tr>
<td>MATH 151A 1 unit</td>
<td>MATH 151B (Upper Division Writing) 3 units</td>
<td>Math 320 (Computer Programming) 3 units</td>
<td>GE C.1 3 units</td>
<td>GE D.1 3 units</td>
<td>GE B.3 1 units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE A.1 3 units</td>
<td>GE A.2 3 units</td>
<td>MATH 251A 1 unit</td>
<td>GE C.2 3 units</td>
<td>GE B.5 3 units</td>
<td>GE D.4 3 units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE A.3 3 units</td>
<td>GE B.2 3 units</td>
<td>GE B.1 3 units</td>
<td>HISTORY 110B GE D.2 3 units</td>
<td>GE D.3 3 units</td>
<td></td>
<td>Electives to complete 120 units</td>
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<tr>
<td>HISTORY 110A GE C.4 3 units</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper Division GE D.5 3 units</td>
<td>Upper Division GE E 3 units</td>
<td>Upper Division GE C.3 3 units</td>
</tr>
<tr>
<td>14 units</td>
<td>15 units</td>
<td>17 units</td>
<td>16 units</td>
<td>15 units</td>
<td>12-15 units</td>
<td>13 units</td>
<td>15-18 units</td>
</tr>
</tbody>
</table>

a. CNSM 101 may be used as a “wild card” replacement course for any cognate
b. Other cognates are also available – see reverse side

### INSTRUCTIONS FOR COMPLETING THE MATHEMATICS BACHELOR OF ARTS

1. Meet with your assigned faculty advisor each semester to plan and review your academic progress.
2. Visit your College of Natural Sciences and Mathematics Student Success Team in MH 488 to review GE and graduation requirements.
3. Complete GE courses in areas A1, A2, and A3 with a C- or higher. Complete a total of 12 units in GE Area B. One course from GE Area Z can also fulfill a requirement in categories D1, C4, or D4. Check your Titan Degree Audit for courses that appear in both categories.
4. All Mathematics courses must be completed with a grade of C or higher.
5. Apply for Graduation through your Student Center at the start of Term 7.

Revised 18 June 2018
### MATHEMATICS BACHELOR OF ARTS

#### PURE MATHEMATICS Concentration

The Math Major is for students who are preparing to (1) enter a graduate study in mathematics, (2) seek math-related careers in business, industry or government, or (3) pursue a career in teaching.

### MATHEMATICS CORE AND SUPPORTING COURSES

- Complete the courses listed below:

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH 190A</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MATH 151A</td>
<td>Calculus I Workshop</td>
</tr>
<tr>
<td>MATH 150B</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MATH 151B</td>
<td>Calculus II Workshop</td>
</tr>
<tr>
<td>MATH 250A</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MATH 251A</td>
<td>Calculus III Workshop</td>
</tr>
<tr>
<td>MATH 250B</td>
<td>Intro to Linear Algebra and Differential Equations</td>
</tr>
<tr>
<td>MATH 280</td>
<td>Strategies of Proof</td>
</tr>
<tr>
<td>MATH 307</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MATH 350</td>
<td>Advanced Calculus I</td>
</tr>
</tbody>
</table>

- Pure Mathematics Concentration Requirements (21 units total)

**Pure Mathematics Required Courses (9 units)**

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH 302</td>
<td>Modern Algebra (3)</td>
</tr>
<tr>
<td>MATH 414</td>
<td>Topology (3)</td>
</tr>
<tr>
<td>MATH 450</td>
<td>Advanced Calculus II (3)</td>
</tr>
</tbody>
</table>

**Pure Mathematics Elective Courses (12 units)**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MATH 407</td>
<td>Abstract Algebra (3)</td>
</tr>
<tr>
<td>MATH 412</td>
<td>Complex Analysis (3)</td>
</tr>
<tr>
<td>MATH 425</td>
<td>Differential Geometry (3)</td>
</tr>
<tr>
<td>MATH 430</td>
<td>Number Theory (3)</td>
</tr>
<tr>
<td>MATH 471</td>
<td>Combinatorics (3)</td>
</tr>
</tbody>
</table>

### COGNATE OPTIONS

Each student is required to select one of the following cognates:

**Chemistry**  
10 Units  
- CHEM 120A  
  General Chemistry (5)  
- CHEM 120B  
  General Chemistry (5)  

**Civil Engineering**  
9 Units  
- EGCE 201  
  Statics (3)  
- EGCE 301  
  Mechanics of Materials (3)  
- EGCE 302 OR EGCE 325  
  Dynamics (3) Structural Analysis (3)  

**Computer Science**  
10 Units  
- CPSC 131  
  Data Structures Concepts (3)  
- CPSC 223H OR CPSC 223J OR CPSC 223N  
  Visual BASIC Programming (3) Java Programming (3) Visual C# Programming (3)  
- CPSC 240 OR CPSC 332  
  Computer System Architecture I (3) File Structures and Database Systems (3)  
- CPSC 253U  
  Operating System Workshop in Unix (1)  

**Economics**  
9 Units  
- ECON 201  
  Principles of Microeconomics (3)  
- ECON 202  
  Principles of Macroeconomics (3)  
- ECON 310 OR ECON 320 OR ECON 440 OR ECON 441  
  Intermediate Microeconomics Analysis (3) Intermediate Macroeconomics Analysis (3) Econometrics (3) Mathematical Economics (3)  

**Finance**  
9 Units  
- FIN 320  
  Financial Management (3)  
- Two of the following three course options:  
  - FIN 340  
    Introduction to Investments (3)  
  - FIN 360  
    Principles of Insurance (3)  
  - ISDS 473  
    Applied Business Forecasting (3)  

**Intro to Math**  
10 Units  
- CNSM 101  
  Think Like Einstein (3)

MATH 107  
Intro to Computational Linear Algebra (4)  
MATH 180 OR MATH 210  
Strategies of Problem Solving (3) Laplace Transforms and Fourier Series (3)

**ISDS**  
9 Units  
Three of the following course options:  
- ISDS 422  
  Surveys and Sampling Design and Applications (3)  
- ISDS 465  
  Linear Programming in Management Science (3)  
- ISDS 467  
  Statistical Quality Control (3)  
- ISDS 472  
  Design of Experiments (3)  
- ISDS 474  
  Data Mining (3)  
- ISDS 475  
  Multivariate Analysis (3)

**Physics**  
11 Units  
- PHYS 225  
  Mechanics (3)  
- PHYS 225L  
  Fundamental Physics: Laboratory (1)  
- PHYS 226  
  Fundamental Physics: Electricity Magnetism (3)  
- PHYS 226L  
  Fundamental Physics: Laboratory (1)  
- PHYS 227  
  Fundamental Physics: Waves, Optics and Modern Physics (3)

**Mathematics**  
9 Units  
Three upper-division Mathematics courses from one of four Mathematics major concentrations other than student’s concentration.

**Research**  
9 Units  
- MATH 491  
  Research Seminar (1)  
- MATH 497  
  Undergraduate Research (3,3)  
- MATH 498  
  Senior Thesis (2)

*The research cognate is intended for students that would benefit more from research and a thesis than a standard cognate. Student should begin this cognate no later than their junior year.

### UNIVERSITY & GE REQUIREMENTS

**Upper Division Writing Requirement**

To meet the upper-division baccalaureate writing requirement, students must pass with a “C” (2.0) or better MATH 380.

**Computer Programming Requirement**

To meet the elementary computer programming requirement, students must pass with a “C” (2.0) or better MATH 320, CPSC 120 or CPSC 121.

### GENERAL EDUCATION REQUIREMENTS

- **Area A Core Competencies**  – 9 units
  
  Subarea | Title                                      |
  --------|--------------------------------------------|
  A1      | Oral Communication                         |
  A2      | Written Communication                      |
  A3      | Critical Thinking                          |

- **Area B Scientific and Quantitative Reasoning**  – 12 units
  
  Subarea | Title                                      |
  --------|--------------------------------------------|
  B1      | Physical Science                          |
  B2      | Life Science                              |
  B3      | Laboratory Experience                     |
  B4      | Mathematics/Quantitative Reasoning        |
  B5      | Implications & Explorations NSM (upper div)|

- **Area C Arts and Humanities**  – 12 units
  
  Subarea | Title                                      |
  --------|--------------------------------------------|
  C1      | Introduction to the Arts                  |
  C2      | Introduction to the Humanities            |
  C3      | Origins of World Civilizations            |
  C4      | Explorations in the Arts and Humanities (upper div)|

- **Area D Social Sciences**  – 15 units
  
  Subarea | Title                                      |
  --------|--------------------------------------------|
  D1      | Introduction to the Social Sciences       |
  D2      | American History, Institutions, and Values|
  D3      | American Government                       |
  D4      | Explorations in the Social Sciences (upper div)|

- **Area E Lifelong Learning and Self Development**  – 3 units of your choosing

- **Area Z Cultural Diversity**  
  Area Z should be completed with a course that will fulfill Area C4 and Area Z OR Area D1 and Area Z OR Area D4 and Area Z.