

# MATHEMATICS (B.S.)

120 credits of coursework is required for the baccalaureate degree with a minimum 2.0 overall GPA, and a minimum 2.0 major GPA.

## Program Requirements Overview

| Code                                      | Title | Credits    |
|---|-------|------------|
| General Education Requirements            |       | 32         |
| World Languages and Cultures Requirements |       | 3-9        |
| Major Requirements                        |       | 55         |
| Free Electives                            |       | 30-24      |
| <b>Total Credits</b>                      |       | <b>120</b> |

## Major Requirements

| Code                                   | Title  | Credits   |
|--|--|-----------|
| <b>Core Requirements</b>               |  |           |
| MATH 122                               | Calculus I   | 4         |
| MATH 221                               | Calculus II  | 4         |
| MATH 222                               | Calculus III   | 4         |
| MATH 225                               | Linear Algebra   | 4         |
| MATH 340                               | Probability  | 3         |
| <b>Specialization Requirements</b>     |  |           |
| MATH 320                               | Transitions to Advanced Mathematics                      | 3         |
| MATH 425                               | Advanced Calculus I                                      | 3         |
| MATH 431                               | Foundations of Modern Algebra                            | 3         |
| <b>Collateral Requirement</b>          |  |           |
| CSIT 111<br>or CSIT 104                | Fundamentals of Java Programming<br>Python Programming I | 3         |
| PHYS 191                               | University Physics I                                     | 4         |
| PHYS 192                               | University Physics II                                    | 4         |
| <b>Electives</b>                       |  |           |
| Select 15 credits from the list below. |  | 15        |
| <b>Capstone</b>                        |  |           |
| MATH 499                               | Math Senior Workshop                                     | 1         |
| <b>Total Credits</b>                   |  | <b>55</b> |

## Mathematics Electives

| Code     | Title                              | Credits |
|----------|------------------------------------|---------|
| COED 401 | Cooperative Education Experience I | 3-8     |
| ECON 408 | Strategic Thinking and Game Theory | 3       |
| MATH 323 | Complex Variables                  | 3       |
| MATH 325 | Ordinary Differential Equation     | 4       |
| MATH 360 | Mathematical Modeling in Biology   | 3       |
| MATH 364 | Operations Research I              | 3       |
| MATH 369 | Mathematical Modeling              | 3       |
| MATH 375 | History of Mathematics             | 3       |
| MATH 398 | Vector Calculus                    | 3       |
| MATH 421 | Partial Differential Equations     | 3       |
| MATH 426 | Advanced Calculus II               | 3       |
| MATH 433 | Theory of Numbers                  | 3       |
| MATH 450 | Foundations of Geometry            | 3       |
| MATH 451 | Topology                           | 3       |

|          |  |     |
|----------|--|-----|
| MATH 460 | Introduction to Applied Mathematics                  | 3   |
| MATH 463 | Numerical Analysis                                   | 3   |
| MATH 465 | Operations Research II                               | 3   |
| MATH 478 | Theoretical Fluid Dynamics                           | 3   |
| MATH 485 | Applied Combinatorics and Graph Theory               | 3   |
| MATH 487 | Introduction to Mathematical Cryptography            | 3   |
| MATH 490 | Honors Seminar                                       | 3   |
| MATH 491 | Research in Mathematics Education                    | 3   |
| MATH 495 | Special Topics in Advanced Undergraduate Mathematics | 1-3 |
| MATH 497 | Mathematics Research I                               | 1-3 |
| MATH 498 | Mathematics Research II                              | 1-3 |
| PHYS 368 | Fluid Mechanics                                      | 3   |
| SOCI 301 | Sociological Research Methods I                      | 4   |
| STAT 230 | Data Science and Statistics                          | 3   |

## General Education Requirements

Click here for a list of courses that fulfill General Education categories. (<http://catalog.montclair.edu/programs/general-education-requirements-ba-bs/>)

| Code  | Title  | Credits   |
|---|--|-----------|
| <b>A. New Student Seminar</b>                         |  |           |
| Complete a 1 credit New Student Seminar course.       |  | 1         |
| <b>C. Communication</b>                               |  |           |
| 1. Writing  |  | 3         |
| 2. Literature   |  | 3         |
| 3. Communication                                      |  | 3         |
| <b>D. Fine and Performing Arts</b>                    |  |           |
| Complete a 3 credit Fine and Performing Arts course.  |  | 3         |
| <b>F. Humanities</b>                                  |  |           |
| 1. Great Works and Their Influences                   |  | 3         |
| 2. Philosophical and Religious Perspectives           |  | 3         |
| <b>G. Computer Science</b>                            |  |           |
| CSIT 111<br>or CSIT 104                               | Fundamentals of Java Programming (Fulfilled in the major.)<br>Python Programming I |           |
| <b>H. Mathematics</b>                                 |  |           |
| MATH 122  | Calculus I (Fulfilled in the major.)   |           |
| <b>I. Natural Science Laboratory</b>                  |  |           |
| PHYS 191  | University Physics I (Fulfilled in the major.)                                     |           |
| <b>J. Physical Education</b>                          |  |           |
| Complete a 1 credit Physical Education course.        |  | 1         |
| <b>K. Social Science</b>                              |  |           |
| 1. American and European History                      |  | 3         |
| 2. Global Cultural Perspectives                       |  | 3         |
| 3. Social Science Perspectives                        |  | 3         |
| <b>L. Interdisciplinary Studies</b>                   |  |           |
| Complete a 3 credit Interdisciplinary Studies course. |  | 3         |
| <b>Total Credits</b>                                  |  | <b>32</b> |

## World Languages and Cultures Requirements

Click here for a list of courses that fulfill World Languages and Cultures categories. (<http://catalog.montclair.edu/programs/world-languages-and-cultures-requirements/>)

| Code                   | Title  | Credits    |
|------------------------|--|------------|
| <b>World Languages</b> |  |            |
|                        | Based on language placement exam, complete one or two sequential courses in the same language. <b>Requirement is automatically fulfilled by language major courses.</b>                              | 3-6        |
| <b>World Cultures</b>  |  |            |
|                        | Requirement may be fulfilled by course selected in General Education 0-3 - Social Science: Global Cultural Perspectives. Requirement may also be fulfilled by major coursework. See list of courses. | 0-3        |
| <b>Total Credits</b>   |  | <b>3-9</b> |

## Recommended Roadmap to Degree Completion

This four-year plan is provided as an outline for students to follow in order to complete their degree requirements within four years. This plan is a recommendation and students should only use it in consultation with their academic advisor.

### First Year

| Fall                            | Credits | Spring                                      | Credits |
|---------------------------------|---------|---|---------|
| MATH 102                        |         | 1 GENERAL EDUCATION: (C2) Literature        | 3       |
| GENERAL EDUCATION: (C1) Writing |         | 3 GENERAL EDUCATION: (C3) Communication     | 3       |
| CSIT 111 or 104                 |         | 3 GENERAL EDUCATION: (J) Physical Education | 1       |
| MATH 122                        |         | 4 MATH 221                                  | 4       |
| PHYS 191                        |         | 4 PHYS 192                                  | 4       |
| <b>15</b>                       |         | <b>15</b>                                   |         |

### Second Year

| Fall                     | Credits | Spring                     | Credits |
|--------------------------|---------|----------------------------|---------|
| General Education course |         | 3 General Education course | 3       |
| World Language 1         |         | 3 World Language 2         | 3       |
| MATH 222                 |         | 4 MATH 340                 | 3       |
| MATH 225                 |         | 4 Free Elective            | 3       |
| Free Elective            |         | 3 Free Elective            | 3       |
| <b>17</b>                |         | <b>15</b>                  |         |

### Third Year

| Fall                     | Credits | Spring                     | Credits |
|--------------------------|---------|----------------------------|---------|
| General Education course |         | 3 General Education course | 3       |
| General Education course |         | 3 General Education course | 3       |
| MATH 320                 |         | 3 MATH 431                 | 3       |
| Major Elective           |         | 3 Major Elective           | 3       |
| Free Elective            |         | 3 Major Elective           | 3       |
| <b>15</b>                |         | <b>15</b>                  |         |

### Fourth Year

| Fall                     | Credits | Spring           | Credits |
|--------------------------|---------|------------------|---------|
| General Education course |         | 3 Major Elective | 3       |
| World Cultures           |         | 3 Major Elective | 3       |
| MATH 425                 |         | 3 Free Elective  | 3       |
| MATH 499                 |         | 1 Free Elective  | 3       |
| Free Elective            | 3       |                  |         |
| Free Elective            | 3       |                  |         |
| 16                       |         | 12               |         |
| Total Credits 120        |         |                  |         |