# Mathematics BS / Biostatistics BS

## Program Requirements

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| **General Education Requirements** | | |
| CIVC 101 | Introduction to Civic Engagement | 1.0 |
| COM 230 | Techniques of Speaking | 3.0 |
| COOP 101 | Career Management and Professional Development * | 1.0 |
| ENGL 101 | Composition and Rhetoric I: Inquiry and Exploratory Research | 3.0 |
| or ENGL 111 | English Composition I | |
| ENGL 102 | Composition and Rhetoric II: Advanced Research and Evidence-Based Writing | 3.0 |
| or ENGL 112 | English Composition II | |
| ENGL 103 | Composition and Rhetoric III: Themes and Genres | 3.0 |
| or ENGL 113 | English Composition III | |
| UNIV S101 | The Drexel Experience | 1.0 |
| UNIV S201 | Looking Forward: Academics and Careers | 1.0 |
| **Computer Science sequence:** | | **9.0** |
| CS 150 | Computer Science Principles | |
| or CS 164 | Introduction to Computer Science | |
| CS 171 | Computer Programming I | |
| CS 172 | Computer Programming II | |
| Any Biology (BIO) course | | 3.0-4.0 |
| Any Chemistry (CHEM) course | | 3.0-4.0 |
| Any Physics (PHYS) course | | 3.0-4.0 |
| Humanities electives | | 6.0 |
| Social sciences electives | | 15.0 |
| International studies or studies in diversity electives | | 6.0 |
| Free electives | | 40.0 |
| **Mathematics Requirements** | | |
| MATH 121 | Calculus I ** | 4.0 |
| MATH 122 | Calculus II | 4.0 |
| MATH 123 | Calculus III | 4.0 |
| MATH 200 | Multivariate Calculus | 4.0 |
| MATH 201 | Linear Algebra | 4.0 |
| MATH 210 | Differential Equations | 4.0 |
| MATH 220 [WI] | Introduction to Mathematical Reasoning | 3.0 |
| MATH 331 | Abstract Algebra I | 4.0 |
| MATH 332 | Abstract Algebra II | 3.0 |
| MATH 401 | Elements of Modern Analysis I | 3.0 |
| MATH 402 | Elements of Modern Analysis II | 3.0 |
| **Math Major Electives** | | **40.0** |
| Select a minimum of 40 credits from the following: | | |
| MATH 222 [WI] | Combinatorics | |
| MATH 235 | Math Competition Problem Solving Seminar | |
| MATH 250 | Mathematics of Investment and Credit | |
| MATH 285 | Differential Equations II | |
| MATH 300 | Numerical Analysis I | |
| MATH 301 | Numerical Analysis II | |
| MATH 305 | Introduction to Optimization Theory | |
| MATH 311 | Probability and Statistics I | |
| MATH 312 | Probability and Statistics II | |
| MATH 313 | Probability and Statistics III | |
| MATH 316 | Mathematical Applications of Symbolic Software | |
| MATH 318 [WI] | Mathematical Applications of Statistical Software | |
| MATH 319 | Techniques of Data Analysis | |
| MATH 320 | Actuarial Mathematics | |
| MATH 321 | Vector Calculus | |
| MATH 322 | Complex Variables | |
| MATH 323 | Partial Differential Equations | |
| MATH 387 | Linear Algebra II | |
| MATH 422 | Introduction to Topology | |
| MATH 449 | Mathematical Finance | |
| MATH 450 | Introduction to Graph Theory | |
| MATH 475 | Cryptography | |
| MATH 483 | Introduction to Monte Carlo Methods | |
| MATH 489 | Tensor Calculus | |
| **MS required courses** | | |
| MATH 504 | Linear Algebra & Matrix Analysis | 3.0 |
| MATH 505 | Principles of Analysis I | 3.0 |
| MATH 506 | Principles of Analysis II | 3.0 |
| MATH 533 | Abstract Algebra I | 3.0 |
| MATH 630 | Complex Variables I | 3.0 |
| MATH 633 | Real Variables I | 3.0 |
| **MS electives *** ** | | **27.0** |
| Select a minimum of 27 credits from the following: | | |
| MATH 507 | Applied Mathematics I | |
| MATH 508 | Applied Mathematics II | |
| MATH 509 | Applied Mathematics III | |
| MATH 510 | Applied Probability and Statistics I | |
| MATH 511 | Applied Probability and Statistics II | |
| MATH 512 | Applied Probability and Statistics III | |
| MATH 520 | Numerical Analysis I | |
| MATH 521 | Numerical Analysis II | |
| MATH 522 | Numerical Analysis III | |
| MATH 523 | Computer Simulation I | |
| MATH 524 | Computer Simulation II | |
| MATH 525 | Topics in Computer Simulation | |
| MATH 526 | Mathematics for Data Science | |
| MATH 530 | Combinatorial Mathematics I | |
| MATH 531 | Combinatorial Mathematics II | |
| MATH 532 | Topics in Combinatorial Math | |
| MATH 534 | Abstract Algebra II | |
| MATH 535 | Topics in Abstract Algebra | |
| MATH 536 | Topology I | |
| MATH 537 | Topology II | |
| MATH 538 | Manifolds | |
| MATH 540 | Numerical Computing | |
| MATH 553 | Sci Comp & Visualization I | |
| MATH 554 | Sci Comp & Visualization II | |
| MATH 555 | Topics in Sci Comp & Visualiz | |
| MATH 572 | Financial Mathematics: Fixed Income Securities | |
| MATH 610 | Probability Theory I | |
| MATH 611 | Probability Theory II | |
| MATH 612 | Topics in Probability Theory | |
| MATH 613 | Stochastic Processes I | |
| MATH 614 | Stochastic Processes II | |
| MATH 615 | Topics in Stochastic Processes | |
| MATH 620 | Partial Differential Equations I | |
| MATH 621 | Partial Differential Equations II | |
| MATH 622 | Partial Differential Equations III | |
| MATH 623 | Ordinary Differential Equations I | |
| MATH 624 | Ordinary Differential Equations II | |
| MATH 625 | Ordinary Differential Equations III | |
| MATH 631 | Complex Variables II | |
| MATH 632 | Topics in Complex Variables | |
| MATH 634 | Real Variables II | |
| MATH 635 | Real Variables III | |
| MATH 640 | Functional Analysis | |

| | | |
|---|---|---|
| MATH 641 | Harmonic Analysis | |
| MATH 642 | Operator Theory | |
| MATH 643 | Integral Equations I | |
| MATH 645 | Transform Theory I | |
| MATH 646 | Transform Theory II | |
| MATH 660 | Lie Groups and Lie Algebras I | |
| MATH 661 | Lie Groups and Lie Algebras II | |
| MATH 662 | Lie Groups/Algebras III | |
| MATH 670 | Methods of Optimization I | |
| MATH 671 | Methods of Optimization II | |
| MATH 672 | Methods of Optimization III | |
| MATH 673 | Calculus of Variations | |
| MATH 701 | Algebraic Combinatorics | |
| MATH 723 | Mathematical Neuroscience | |
| **Total Credits** | | **226.0-229.0** |

* Co-op cycles may vary. Students are assigned a co-op cycle (fall/winter, spring/summer, summer-only) based on their co-op program (4-year, 5-year) and major.

COOP 101 registration is determined by the co-op cycle assigned and may be scheduled in a different term. Select students may be eligible to take COOP 001 in place of COOP 101.

** Math majors must pass MATH 121 (http://catalog.drexel.edu/search/?P=MATH%20121) with a grade of B or higher.

*** In some cases, course substitutions may be made with courses from other departments. Elective courses taken outside the department must receive prior departmental approval in order to be counted toward the degree.

# Sample Plan of Study

## 4+1, 1 co-op (Accelerated program completed in 5 years)

*Students complete undergraduate requirements in four years, then convert to graduate status in the fifth and final year.*

**First Year**

| Fall | Credits | Winter | Credits | Spring | Credits | Summer | Credits |
|---|---|---|---|---|---|---|---|
| CS 150 or 164 | 3.0 | CIVC 101 | 1.0 | CS 172 | 3.0 | VACATION | |
| ENGL 101 or 111 | 3.0 | CS 171 | 3.0 | ENGL 103 or 113 | 3.0 | | |
| MATH 121 | 4.0 | ENGL 102 or 112 | 3.0 | MATH 123 | 4.0 | | |
| UNIV S101 | 1.0 | MATH 122 | 4.0 | MATH 200 | 4.0 | | |
| (UG) Any Biology (BIO) Course | 3.0-4.0 | (UG) Any Chemistry (CHEM) Course | 3.0 | (UG) Any Physics (PHYS) Course | 3.0 | | |
| | **14-15** | | **14** | | **17** | | **0** |

**Second Year**

| Fall | Credits | Winter | Credits | Spring | Credits | Summer | Credits |
|---|---|---|---|---|---|---|---|
| COM 230 | 3.0 | MATH 210 | 4.0 | (UG) Free Elective | 3.0 | COOP 101 | 1.0 |
| MATH 201 | 4.0 | (UG) Internationa Diversity Studies Elective* | 3.0 | (UG) Humanities Elective* | 3.0 | (UG) Free Electives | 9.0 |
| MATH 220 | 3.0 | (UG) Mathematics (MATH) Electives** | 7.0 | (UG) Mathematics (MATH) Electives** | 7.0 | (UG) Humanities Elective* | 4.0 |
| (UG) Internationa Diversity Studies Elective* | 3.0 | (UG) Social Science Elective* | 3.0 | (UG) Social Science Elective* | 3.0 | (UG) Social Science Elective* | 3.0 |
| (UG) Social Science Elective* | 3.0 | | | | | | |
| | **16** | | **17** | | **16** | | **17** |

**Third Year**

| Fall | Credits | Winter | Credits | Spring | Credits | Summer | Credits |
|---|---|---|---|---|---|---|---|
| MATH 331 | 4.0 | MATH 332 | 3.0 | COOP EXPERIENCE | | COOP EXPERIENCE | |
| MATH 401 | 3.0 | MATH 402 | 3.0 | | | | |
| (UG) Free Electives | 6.0 | UNIV S201 | 1.0 | | | | |
| (UG) Mathematics (MATH) Elective** | 4.0 | (UG) Free Electives | 6.0 | | | | |
| | | (UG) Social Science Elective* | 3.0 | | | | |
| | **17** | | **16** | | **0** | | **0** |

**Fourth Year**

| Fall | Credits | Winter | Credits | Spring | Credits | Summer | Credits |
|---|---|---|---|---|---|---|---|
| (UG) Free Electives | 6.0 | (UG) Free Electives | 6.0 | (UG) Free Electives | 6.0 | VACATION | |
| (UG) Mathematics (MATH) Electives** | 7.0 | (UG) Mathematics (MATH) Electives** | 6.0 | (UG) Mathematics (MATH) Electives** | 6.0 | | |
| MATH 504 | 3.0 | MATH 506 | 3.0 | (GR) Graduate Mathematics (MATH) Electives | 6.0 | | |
| MATH 505 | 3.0 | MATH 533 | 3.0 | | | | |
| | **19** | | **18** | | **18** | | **0** |

**Fifth Year**

| Fall | Credits | Winter | Credits | Spring | Credits |
|---|---|---|---|---|---|
| (GR) Graduate Mathematics (MATH) Electives | 9.0 | (GR) Graduate Mathematics (MATH) Electives | 9.0 | MATH 630 | 3.0 |
| | | | | MATH 633 | 3.0 |
| | | | | (GR) Graduate Mathematics (MATH) Elective | 3.0 |
| | **9** | | **9** | | **9** |

**Total Credits 226-227**

* See degree requirements (http://catalog.drexel.edu/undergraduate/collegeofartsandsciences/mathematics/#degreerequirementsbatext).

** Select from MATH 222 [WI] , MATH 235, MATH 250, MATH 285, MATH 300, MATH 301, MATH 305, MATH 311, MATH 312, MATH 316, MATH 318 [WI] , MATH 319, MATH 320, MATH 321, MATH 322, MATH 323, MATH 387, MATH 422, MATH 449, MATH 450, MATH 475, MATH 483, MATH 489. MATH special

topics courses may be substituted for Mathematics Electives with departmental permission.