Mathematics

Degree Awarded

- Bachelor of Science

Nature of Program

Mathematics is the foundation for many of the natural sciences and, as knowledge is expanded in these sciences, new demands are made on mathematics to provide ideas to be used in advancing the sciences. Older sciences such as physics, chemistry, and engineering depend on mathematics, as do a large number of new and sophisticated subjects. The student’s career in mathematics might include college teaching and research, computers, statistics, and many others.

Program Objectives

The graduates of the Mathematics program:

- Should be able to attend graduate school or find employment in industry or government.
- Will have a rounded education that encourages and supports meaningful dialogue with individuals from other disciplines especially sciences and engineering.
- Will be prepared to participate in lifelong learning opportunities.

GENERAL EDUCATION FOUNDATIONS

Please use this link to view a list of courses that meet each GEF requirement. (http://registrar.wvu.edu/gef)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

General Education Foundations

<table>
<thead>
<tr>
<th>F1 - Composition &amp; Rhetoric</th>
<th>3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 &amp; ENGL 102</td>
<td>Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research</td>
</tr>
<tr>
<td>or ENGL 103</td>
<td>Accelerated Academic Writing</td>
</tr>
</tbody>
</table>

| F2A/F2B - Science & Technology | 4-6 |
| F3 - Math & Quantitative Skills | 3-4 |
| F4 - Society & Connections | 3 |
| F5 - Human Inquiry & the Past | 3 |
| F6 - The Arts & Creativity | 3 |
| F7 - Global Studies & Diversity | 3 |
| F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree) | 9 |

Total Hours: 31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

Curriculum Requirements for Classic Track

<table>
<thead>
<tr>
<th>GEF Requirements</th>
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<tbody>
<tr>
<td>ENGL 101 &amp; ENGL 102</td>
</tr>
<tr>
<td>WVUE 191</td>
</tr>
</tbody>
</table>

A minimum GPA of 2.0 is required in all major coursework

| ENGL 305 | Technical Writing |
| PHYS 111 | General Physics (GEF 2) |
| MATH 155 | Calculus 1 (GEF 3) |
| MATH 156 | Calculus 2 (GEF 8) |
| MATH 251 | Multivariable Calculus |
| MATH 261 | Elementary Differential Equations |

15
MATH 283  Introduction to the Concepts of Mathematics  3
MATH 341  Introduction to Algebraic Structures  3
MATH 441  Applied Linear Algebra  3
MATH 448  Probability and Statistics  3
MATH 451  Introduction to Real Analysis 1  3
MATH 452  Introduction to Real Analysis 2  3
MATH 496  Senior Thesis  2
CS 121  Computer Science 1  4
CS 122  Computer Science 2  4
MATH Elective (300+ or 400+ level; except MATH 315)  6
Technical Elective  16
Elective  25
Total Hours  120

Technical Electives

BIOL 111  General Biology  4
BIOL 112  General Biology  4
BIOL 230  Human Anatomy and Physiology 1  4
BIOL 231  Human Anatomy and Physiology 2  4
BIOL 240  Microbiology  4
CE 204  Surveying  3
CHE 201  Material and Energy Balances 1  3
CHE 202  Material and Energy Balances 2  3
CHEM 111  Survey of Chemistry  4
CHEM 112  Survey of Chemistry  4
CHEM 115  Fundamentals of Chemistry  4
CHEM 116  Fundamentals of Chemistry  4
CPE 271  Introduction to Digital Logic Design  3
CPE 272  Digital Logic Laboratory  1
CS 201  Data Structures  3
CS 222  Intro Software Engineering  3
CS 231  Introduction to Computer Organization  3
EE 221  Introduction to Electrical Engineering  3
EE 222  Introduction to Electrical Engineering Laboratory  1
EE 223  Electrical Circuits  3
MAE 240  Manufacturing Processes  3
MAE 241  Statics  3
MAE 242  Dynamics  3
MAE 243  Mechanics of Materials  3
MAE 320  Thermodynamics  3
PHYS 112  General Physics  4
Any BIOL 300-400 Level Course
Any CHE 300-400 Level Course
Any CHEM 300-400 Level Course
Any CE 300-400 Level Course
Any CS 300-400 Level Course
Any CPE 300-400 Level Course
Any EE 300-400 Level Course
Any ENGR 300-400 Level Course
Any MATH 300-400 Level Course (except MATH 315)
### Suggested Plan of Study

#### First Year

**Fall**
- **ENGL 101 (GEF 1)**: 3 Hours
- **WVUE 191**: 1 Hour
- **MATH 155 (GEF 3)**: 4 Hours
- **CS 121**: 4 Hours
- **Elective**: 3 Hours

**Spring**
- **ENGL 102 (GEF 1)**: 3 Hours
- **MATH 156 (GEF 8)**: 4 Hours
- **CS 122**: 4 Hours
- **4 GEF 4**: 3 Hours
- **3 Elective**: 1 Hour

**Total Hours**: 15

#### Second Year

**Fall**
- **MATH 283**: 3 Hours
- **MATH 251**: 4 Hours
- **PHYS 111 (GEF 2)**: 4 Hours
- **GEF 5**: 3 Hours
- **Elective**: 3 Hours

**Spring**
- **MATH 261**: 4 Hours
- **MATH Elective (300-400 level)**: 3 Hours
- **Technical Elective (GEF 8)**: 4 Hours
- **3 Elective**: 3 Hours
- **3 Elective**: 3 Hours

**Total Hours**: 14

#### Third Year

**Fall**
- **ENGL 305**: 3 Hours
- **MATH 448**: 3 Hours
- **GEF 6**: 3 Hours
- **Technical Elective**: 3 Hours
- **Elective**: 3 Hours

**Spring**
- **MATH 341**: 3 Hours
- **MATH 441**: 3 Hours
- **3 Technical Elective**: 3 Hours
- **3 GEF 7**: 3 Hours
- **3 Elective**: 3 Hours

**Total Hours**: 15

#### Fourth Year

**Fall**
- **MATH 451**: 3 Hours
- **MATH Elective (300-400 level)**: 3 Hours
- **Technical Elective**: 3 Hours
- **GEF 8**: 3 Hours
- **Elective**: 3 Hours

**Spring**
- **MATH 452**: 3 Hours
- **MATH 496**: 2 Hours
- **3 Technical Elective**: 3 Hours
- **3 Elective**: 3 Hours
- **3 Elective**: 3 Hours

**Total Hours**: 15

**Total credit hours: 120**

### Major Learning Outcomes

**MATHEMATICS**

The graduates of the Mathematics program:

- Will be critical thinkers and problem solvers.
- Will be able to understand the concepts, solve the problems, and prove theorems in at least three of the four major areas of mathematics - Algebra, Analysis, Applied Mathematics, and Geometry/Topology.
- Will be able to develop computer programs to implement computational algorithms.
- Will be able to communicate effectively.

**MATHEMATICS MINOR**

**MINOR CODE - UT14**

**Required Courses**
- **MATH 155 Calculus 1**: 4 Hours
<table>
<thead>
<tr>
<th>Course</th>
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<th>Hours</th>
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<tr>
<td>MATH 156</td>
<td>Calculus 2</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MATH 261</td>
<td>Elementary Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>MATH 441</td>
<td>Applied Linear Algebra</td>
<td>3</td>
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Select two of the following courses:  

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<tr>
<td>MATH 283</td>
<td>Introduction to the Concepts of Mathematics</td>
</tr>
<tr>
<td></td>
<td>MATH 300+ or 400+ Level Courses (excluding MATH 315)</td>
</tr>
</tbody>
</table>

Total Hours 25