Mathematics, B.S.

Degree Offered

- Bachelor of Science

Nature of the 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.

Code	Title	Hours
General Education Foundations		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research	
or ENGL 103	Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		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

Code	Title	Hours
University Requirements		47
Program Requirements		23
Mathematics Major Requirements		50
Total Hours		120

University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 4, 5, 6, 7, and 8		24
WVUE 191	First Year Seminar	1
General Electives		22
Total Hours		47

Program Requirements

Code	Title	Hours
CS 121	Computer Science 1	4
CS 122	Computer Science 2	4
MATH 155	Calculus 1 (GEF 3)	4
MATH 156	Calculus 2 (GEF 8)	4
PHYS 111 & 111L	General Physics 1 and General Physics 1 Laboratory (GEF 2)	4
WRIT 305	Technical Writing	3
Total Hours		23

Mathematics Major Requirements

Code	Title	Hours
A minimum GPA of a 2.0 is required in all major coursework		
MATH 251	Multivariable Calculus	4
MATH 261	Elementary Differential Equations	4
MATH 303	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
MATH Elective (300+ or 400+ level; except MATH 315)		**6**
Approved Minor or Technical Electives *		**16**
Total Hours		50

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Approved Minors include Biology, Chemistry, or Computer Science.

Technical Electives

Code	Title	Hours
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 & 111L	Survey of General, Organic, and Biological Chemistry 1 and Survey of Chemistry 1 Laboratory	4
CHEM 112 & 112L	Survey of General Organic Biological Chemistry 2 and Survey of Chemistry 2 Laboratory	4

CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory	4
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	4
CPE 271	Introduction to Digital Logic Design	3
CPE 271L	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 221L	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 & 112L	General Physics 2 and General Physics 2 Laboratory	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)		
Any MAE 300-400 Level Course		
Any PHYS 300-400 Level Course		

Suggested Plan of Study

First Year

Fall	Hours	Spring	Hours
ENGL 101 (GEF 1)	3	ENGL 102 (GEF 1)	3
WVUE 191	1	MATH 156 (GEF 8)	4
MATH 155 (GEF 3)	4	CS 122	4
CS 121	4	GEF 4	3
Elective	3	Elective	1
	15		15

Second Year

Fall	Hours	Spring	Hours
MATH 303	3	MATH 261	4
MATH 251	4	MATH Elective (300-400 level)	3
PHYS 111 & 111L (GEF 2)	4	Technical Elective (GEF 8)/Approved Minor	4
GEF 5	3	Elective	3
		Elective	3
	14		17

Third Year

Fall	Hours	Spring	Hours
MATH 448	3	MATH 341	3

WRIT 305	3	MATH 441	3
GEF 6	3	Technical Elective/Approved Minor	3
Technical Elective/Approved Minor	3	GEF 7	3
Elective	3	Elective	3
	15		15

Fourth Year

Fall	Hours	Spring	Hours
MATH 451	3	MATH 452	3
MATH Elective (300-400 level)	3	MATH 496	2
Technical Elective/Approved Minor	3	Technical Elective/Approved Minor	3
GEF 8	3	Elective	3
Elective	3	Elective	3
	15		14

Total credit hours: 120

Major Learning Outcomes

MATHEMATICS

The graduates of the Mathematics program will demonstrate the following competencies:

1. Students will construct valid proofs.
2. Students will demonstrate their ability to comprehend and to synthesize professional mathematical discourse (such as upper level textbooks, monographs, journal articles, unpublished faculty research, technical reports, etc.).
3. Students will prepare a clear and concise written project and/or orally present advanced mathematical concepts effectively and professionally.
4. Students will demonstrate basic skills in specific mathematics topics (Calculus, Differential Equations, Linear Algebra, Algebraic Structures, Probability, and Analysis).
5. Students will be exposed to the use of mathematics in various applications.
6. Students will demonstrate their ability to understand data and construct mathematical models to solve problems.
7. Students will demonstrate a breadth of knowledge of upper level mathematics topics.