Bachelor of Science in Mathematics

(Applied Mathematics)

Howard University

College of Arts & Sciences

Catalog: Fall 2023 – Present

Quick Summary - What You Need to Graduate

Total Credits	Minimum GPA	Math Credits	Minor Credits	Last 30 Credits
120	2.0	37	15-18 2.0 GPA	At Howard

Your Degree Breakdown:

- Major Requirements: 37 credits (approximately 14 courses)
- Minor Required: 15-18 credits, 2.0 GPA
- General Education: 30+ credits (approximately 15 courses)
- Free Electives: Remaining credits to reach 120 (varies by track)
- Complete all 7 ELOs (can overlap with courses)
- COAS Experiential (1 course) & COAS Innovative Learning (1 course)
- Undergraduate Comprehensive Exam

Important: Double-Dipping Made Simple!

One course can fulfill BOTH a General Education requirement AND an Essential Learning Outcome (ELO) at the same time. You don't need separate courses for each! This helps you graduate efficiently without taking extra classes.

Major credits **cannot** be double dipped with minor credits. While students are not required to declare a minor, those who choose to do so must complete **15–18 credits that are not applied toward their major requirements**. Minor coursework must remain distinct and separate from major coursework.

University-Wide Requirements

- **Minimum GPA:** 2.0 for all undergraduate coursework
- **Residency:** Complete last 30 credits at Howard University
- **Exit Requirement:** Undergraduate Comprehensive Exam
- **Total Credits:** 120 credits required

General Education Requirements (30+ Credits / ~15 Courses)

Essential Learning Outcomes (ELOs)

Students must complete courses covering all seven outcome areas. Remember, these can overlap with other requirements!

- **ELO 1:** U.S. and Global African Diasporic Developments
- **ELO 2:** Human Cultures and Creative Expression
- **ELO 3:** The Physical and Natural World
- **ELO 4:** Intellectual and Practical Skills
- **ELO 5:** Social Responsibility and Political Institutions
- **ELO 6:** Leadership and Applied Learning
- **ELO 7:** Comprehensive Wellness Practices

Note: ELO courses are tagged in Bison Hub under the course description

Freshman Experience (1 Credit / 1 Course)

- **FRSM 001 -** Freshman Seminar (1 credit)

Core Writing & Communication (12 Credits / 4 Courses)

4 courses needed (each 3 credits)

- **ENGW 101, 102, or 104 -** First-Year English Writing I (3 credits)
- **ENGW 103 or 105 -** First-Year English Writing II (3 credits)
- **Third Writing MATH 795 -** Upper-level writing (3 credits)
- **Principles of Speech (AS) -** (3 credits)

Health & Wellness (2 Credits / 1 Course)

- **HHPL Course -** Health, Human Performance, and Leisure (2 credits)

Cultural and Global Awareness (12 Credits / 4 Courses)

- **African American Cluster Course -** 1 course (3 credits)
- **Foreign Language -** 3 courses (9 credits total, same language)
  (3 credits can be an intercultural knowledge)

Humanities & Social Sciences (12 Credits / 4 Courses)

- **One Humanities Courses -** 1 courses (3 credits)
- **Three Social Science Courses -** 3 courses (3 credits each)

Free Electives

Remaining credits to reach 120 total (varies based on math track and elective choices)

COAS Special Requirements

Experiential Learning (1 course required)

Examples of COAS Experiential Learning Course but are not limited to:

- Any 890 course
- Internships
- Study abroad

Innovative Learning Requirement (1 course required)

- Complete at least one course marked as 'innovative'

Note: COAS Special Requirements courses are tagged in Bison Hub under the course description

Minor Requirements (15-18 Credits / 5-6 Courses)

Choose a minor in either Computer Science, Economics, Biology, Chemistry, Physics, Business, or another field approved by the department.

- **Minor Course** - Introductory course in different department (3 credits)
- **Minor Course** - (3 credits)
- **Minor Course** - (3 credits)
- **Minor Course** - (3 credits)
- **Minor Course** - (3 credits)
- **Minor Course** - (3 credits) if needed

Total Applied Math Major Requirements (44 Credits / 13 Courses)

Foundation Courses (31 Credits / 9 Courses)

- **MATH 103** – Proof & Problem Seminar (3 credits)
- **MATH 156 -** Calculus (4 credits)
- **MATH 157 -** Calculus II (4 credits)
- **MATH 158 -** Calculus III (4 credits)
- **MATH 159 –** Differential Equations (4 credits)
- **MATH 164 –** Numerical Analysis (3 credits)
- **MATH 180–** Intro to Linear Algebra (3 credits)
- **MATH 189 –** Probability & Statistics I (3 credits)
- **MATH 195/795 –** Intro to Analysis I / Intro to Analysis Writing (3 credit)

Recommended Math Electives Choose 2 (6 Credits / 2 Courses)

- **MATH 160 –** Advance Calculus for Science & Engineering (3 credits)
- **MATH 181 –** Discrete Structures (3 credits)
- **MATH 183 –** Intermediate Differential Equations (3 credits)
- **MATH 185 –** Intro to Complex Analysis (3 credits)
- **MATH 186 –** Intro to Differential Geometry (3 credits)
- **MATH 190 –** Probability & Statistics II (3 credits)
- **MATH 191 –** Foundation of Applied Math (3 credits)
- **MATH 192 –** Topics in Applied Math (3 credits)
- **MATH 196 –** Intro to Analysis II (3 credits)

Other Electives

- **MATH 184 –** Intro to Number Theory (3 credits)
- **MATH 187 –** Into to Algebraic Topology (3 credits)
- **MATH 194 –** Intro to Set Theory (3 credits)
- **MATH 197 –** Intro to Modern Algebra I (3 credits)
- **MATH 198 –** Intro to Modern Algebra II (3 credits)
- **MATH 199 –** Intro to General Topology (3 credits)

Computer Science Electives (7 Credits / 2 courses)

- **CSCI 100 –** Introduction to Computer Science (3 credits)
- **CSCI 135 –** Computer Science I (4 credits)

Sample Degree Progress Checklist

Always consult with your academic advisor for personalized guidance

Freshman Year (32 Credits)

Fall Semester (15 Credits)

- ☐ FRSM 001 - Freshman Seminar (1 credit)
- ☐ ENGW 101/102/104 - First-Year Writing I (3 credits)
- ☐ MATH 156- Calculus I (4 credits)
- ☐ Intro to CSCI 100 (3 credits)
- ☐ Humanities (3 credits)
- ☐ HHPL (1 credit)

Spring Semester (17 Credits)

- ☐ ENGW 103/105 First-Year Writing II (3 credits)
- ☐ MATH 157 Calculus II (4 credits)
- ☐ MATH 103 Proof & Prob Solving (3 credits)
- ☐ CSCI 135 Computer Science I (4 credits)
- ☐ Social Science (3 credits)

Sophomore Year (30 Credits)

Fall Semester (14 Credits)

- ☐ MATH 158 Calculus III (4 credits)
- ☐ MATH 195/795 Intro to Analysis I (3 Credits)
- ☐ Foreign Language I (3 credits)
- ☐ Social Science (3 credits)
- ☐ HHPL Course (1 credit)

Spring Semester (16 Credits)

- ☐ MATH 159 Diff Equations (4 credits)
- ☐ MATH 180 Linear Algebra (3 credits)
- ☐ Foreign Language II (3 credits)
- ☐ Social Science (3 credits)
- ☐ Minor Elective (3 credits)

Junior Year (27-30 Credits)

Fall Semester (15 Credits)

- ☐ MATH 189 Prob & Stat I (3 Credits)
- ☐ COMM 101 Principles of Speech (3 credits)
- ☐ Experiential Learning Elective (3 Credits)
- ☐ Foreign Language III (3 credits)
- ☐ Minor Elective (3 credits)

Spring Semester (12-15 Credits)

- ☐ MATH 164 Intro Numerical Analysis (3 credits)
- ☐ MATH Specialized Elective (3 credits)
- ☐ African Diasporic Cluster (3 credits)
- ☐ Minor Electives (3-6 credits)

Senior Year (24-30 Credits)

Fall Semester (12-15 Credits)

- ☐ MATH Specialized Elective (3 credits)
- ☐ COAS Innovative Learning (if not completed)
- ☐ Minor Electives (3 credits)
- ☐ Take Undergraduate Comprehensive Exam

Spring Semester (12-15 Credits)

- ☐ MATH Specialized Elective (3 credits)
- ☐ Minor Electives (3-6 credits)
- ☐ Free Electives as needed to reach 120 credits
- ☐ Apply for graduation

Key Requirements Summary

- **Minimum Overall GPA:** 2.0
- **Minor Minimum GPA**: 2.0
- **Credits in Math:** 37 minimum
- **Residency:** Last 30 credits at Howard University

Important Notes for Success

- **Experiential Learning:** Can often be satisfied through 890 courses, internships, etc. Please speak with your advisor for all options.
- **ELO Requirements:** Many built in general electives will automatically satisfy ELO requirements.
- **Minor Requirements**: Must be completed in Computer Science, Economics, Biology, Chemistry, Physics, or Business, or another field approved by the

department. A grade of “D” can pass a course, as long as the minor GPA is 2.0 or higher.

- **Advisor Consultation:** Consult with your academic advisor each semester for course planning.
- **Scholarship Requirements:** Students are required to successfully pass a minimum of 15 credits each semester. There is an exception for students in their final term to take less than 15 credits and still be awarded their scholarship.
- **Freshman** 0-29 completed credits
- **Sophomore**: 30-59 completed credits
- **Junior:** 60-89 completed credits
- **Senior:** 90 or more completed credits

Resources & Support

- **Academic Advisor:** Contact Office of Undergraduate Studies for assignment
- **Department Office:** Mathematics of Arts & Sciences
- **Pre-Health Advising:** Available for students interested in medical/dental/veterinary school.
- **Research Opportunities:** Speak with faculty about laboratory research positions