BACHELOR OF SCIENCE (BS) DEGREE WITH A MAJOR IN MATHEMATICS

Program Learning Outcomes for the BS Degree with a Major in Mathematics
Upon completing the BS degree with a major in Mathematics, students will be able to:

1. Achieve both practical and theoretical fluency in calculus and linear algebra.
2. Acquire a broad background at the undergraduate level in all the major areas of mathematics, including analysis, algebra, and geometry.
3. Learn to read and write proofs.

Requirements for the BS Degree with a Major in Mathematics
For general university requirements, see Graduation Requirements. Students pursuing the BS degree with a major in Mathematics must complete:

- A minimum of 14-17 courses (42-51 credit hours), depending on course selection, to satisfy the major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 11 courses (33 credit hours) taken at the 300-level or above.

Students receive advanced placement (AP) credit by achieving a score of 4 or 5 on the AP AB-level test or by achieving a score of 4 or 5 on the BC-level test. The credit is articulated as MATH 105 or MATH 106. Declared MATH majors who have had calculus but have not taken the AP test may petition the department for a waiver of the calculus requirements. Entering students should enroll in the most advanced course commensurate with their background; advice is available from the mathematics faculty during Orientation Week and at other times.

The chair of the MATH department's undergraduate committee may modify requirements to meet the needs of specific advanced students. If a MATH course is repeatable for credit, the course may only be repeated once.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor, or where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's Official Certifier.) Students and their academic advisors should identify and clearly document the courses to be taken.

<table>
<thead>
<tr>
<th>Summary</th>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credit Hours Required for the Major in Mathematics</td>
<td></td>
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<td>42-51</td>
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<tr>
<td>Total Credit Hours Required for the BS Degree with a Major in Mathematics</td>
<td></td>
<td></td>
<td>120</td>
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<table>
<thead>
<tr>
<th>Degree Requirements</th>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Requirements</td>
<td></td>
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<tr>
<td>Single Variable Calculus</td>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
<td>3</td>
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<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
<td>3</td>
<td></td>
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<tr>
<td>Differential Equations</td>
<td>Select 1 course from the following:</td>
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<td>3</td>
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<tr>
<td>MATH 211</td>
<td>ORDINARY DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA</td>
<td></td>
<td></td>
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<tr>
<td>MATH 220</td>
<td>HONORS ORDINARY DIFFERENTIAL EQUATIONS</td>
<td></td>
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<tr>
<td>MATH 381</td>
<td>INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS</td>
<td></td>
<td></td>
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<tr>
<td>MATH 423 / CAAM 423</td>
<td>PARTIAL DIFFERENTIAL EQUATIONS I</td>
<td></td>
<td></td>
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<tr>
<td>Multivariable Calculus</td>
<td>Select 1 from the following:</td>
<td></td>
<td>3-6</td>
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<tr>
<td>MATH 212</td>
<td>MULTIVARIABLE CALCULUS</td>
<td></td>
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<tr>
<td>MATH 221 &amp; MATH 222</td>
<td>HONORS CALCULUS III and HONORS CALCULUS IV</td>
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<tr>
<td>Linear Algebra</td>
<td>Select 1 course from the following:</td>
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<tr>
<td>MATH 221</td>
<td>HONORS CALCULUS III</td>
<td></td>
<td></td>
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<tr>
<td>MATH 354</td>
<td>HONORS LINEAR ALGEBRA</td>
<td></td>
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<tr>
<td>MATH 355</td>
<td>LINEAR ALGEBRA</td>
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<tr>
<td>Real Analysis</td>
<td>Select 2 courses from the following:</td>
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<tr>
<td>MATH 321</td>
<td>INTRODUCTION TO ANALYSIS I</td>
<td></td>
<td></td>
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<tr>
<td>MATH 322</td>
<td>INTRODUCTION TO ANALYSIS II</td>
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<tr>
<td>MATH 331</td>
<td>HONORS ANALYSIS</td>
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<td>MATH 425</td>
<td>INTEGRATION THEORY</td>
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<tr>
<td>Algebra</td>
<td>Select 2 courses from the following:</td>
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<td>6</td>
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<tr>
<td>MATH 356</td>
<td>ABSTRACT ALGEBRA I</td>
<td></td>
<td></td>
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<tr>
<td>MATH 357</td>
<td>ABSTRACT ALGEBRA II</td>
<td></td>
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<tr>
<td>MATH 463</td>
<td>ADVANCED ALGEBRA I</td>
<td></td>
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<tr>
<td>Geometry and Manifolds</td>
<td>Select 1 course from the following:</td>
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<td>3</td>
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<tr>
<td>MATH 370</td>
<td>CALCULUS ON MANIFOLDS</td>
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<tr>
<td>MATH 401</td>
<td>DIFFERENTIAL GEOMETRY OF CURVES AND SURFACES</td>
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<td>MATH 402</td>
<td>DIFFERENTIAL GEOMETRY</td>
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<tr>
<td>MATH 451</td>
<td>DIFFERENTIABLE MANIFOLDS</td>
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Bachelor of Science (BS) Degree with a Major in Mathematics

Complex Analysis
MATH 382 COMPUTATIONAL COMPLEX ANALYSIS 3
or MATH 427 COMPLEX ANALYSIS

Topology

Select 1 course from the following:
MATH 443 GENERAL TOPOLOGY 3
MATH 444 GEOMETRIC TOPOLOGY
MATH 445 ALGEBRAIC TOPOLOGY

Elective Requirements
Students must complete a minimum of 33 credit hours from departmental (MATH) course offerings at the 300-level or above. 3

Total Credit Hours Required for the Major in Mathematics 42-51
Additional Credit Hours to Complete Degree Requirements 38-47

University Graduation Requirements (https://oaa.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) 31

Total Credit Hours 120

Footnotes and Additional Information
• Note: University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student’s declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

The Elective Requirements can include courses taken from the Core Requirements and/or Elective coursework, for a minimum of 11 courses (33 credit hours) at the 300-level or above. At most, students can take 1 course (3 credit hours) for any given course number to use toward the major. Additionally, at most 3 credit hours from courses numbered MATH 490 through MATH 499 (research and supervised reading courses) can count towards major requirements.

Policies for the BS Degree with a Major in Mathematics

Program Restrictions and Exclusions
Students pursuing the BS Degree with a Major in Mathematics should be aware of the following program restrictions:

• As noted in Majors, Minors, and Certificates (https://oaa.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/) under Declaring Majors, Minors and Certificates, students may not obtain both a BA and a BS in the same major. Students pursuing the BS Degree with a Major in Mathematics may not additionally pursue the BA Degree with a Major in Mathematics.

• As noted in Majors, Minors, and Certificates (https://oaa.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/), students may not major and minor in the same subject.

Transfer Credit
For Rice University’s policy regarding transfer credit, see Transfer Credit (https://oaa.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/). Some departments and programs have additional restrictions on transfer credit. The Office of Academic Advising maintains the university’s official list of transfer credit advisors (https://oaa.rice.edu/advising-network/transfer-credit-advisors/) on their website: https://oaa.rice.edu. Students are encouraged to meet with their academic program’s transfer credit advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines
Students pursuing the major in Mathematics should be aware of the following departmental transfer credit guidelines:

• Requests for transfer credit will be considered by the program director (and/or the program’s official transfer credit advisor) on an individual case-by-case basis.

Additional Information
For additional information, please see the Mathematics website: https://math.rice.edu/

Opportunities for the BS Degree with a Major in Mathematics

Academic Honors
The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see Latin Honors (https://oaa.rice.edu/undergraduate-students/honors-distinctions/university/) (summa cum laude, magna cum laude, and cum laude) and Distinction in Research and Creative Work (https://oaa.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

Additional Information
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