BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN COMPUTATIONAL AND APPLIED MATHEMATICS

Program Learning Outcomes for the BA Degree with a Major in Computational and Applied Mathematics

Upon completing the BA degree with a major in Computational and Applied Mathematics, students will be able to:

1. Use modern numerical methods to analyze and solve typical problems in linear systems.
2. Design and test a mathematical model, following a multi-stage process.

Requirements for the BA Degree with a Major in Computational and Applied Mathematics

For general university requirements, see Graduation Requirements (ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements). Students pursuing the BA degree with a major in Computational and Applied Mathematics must complete:

- A minimum of 17-18 courses (49-52 credit hours) depending on course selection to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 60 credit hours outside of major requirements.
- A minimum of 13 courses (37 credit hours) at the 300-level or above.

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.

Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the Major in Computational and Applied Mathematics</td>
<td>49-52</td>
</tr>
<tr>
<td></td>
<td>Total Credit Hours Required for the BA Degree with a Major in Computational and Applied Mathematics</td>
<td>120</td>
</tr>
</tbody>
</table>

Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introductory Courses 1</td>
<td></td>
</tr>
</tbody>
</table>

CAAM 210 INTRODUCTION TO ENGINEERING COMPUTATION
CAAM 335 MATRIX ANALYSIS
MATH 101 SINGLE VARIABLE CALCULUS I
or MATH 105 AP/OTH CREDIT IN CALCULUS I
MATH 102 SINGLE VARIABLE CALCULUS II
or MATH 106 AP/OTH CREDIT CALCULUS II
Select 1 from the following:
MATH 212 MULTIVARIABLE CALCULUS
MATH 221 HONORS CALCULUS III
& MATH 222 and HONORS CALCULUS IV
Intermediate Courses 3
CAAM 336 DIFFERENTIAL EQUATIONS IN SCIENCE AND ENGINEERING
CAAM 378 INTRODUCTION TO OPERATIONS RESEARCH AND OPTIMIZATION
MATH 321 INTRODUCTION TO ANALYSIS I
or MATH 302 ELEMENTS OF ANALYSIS
STAT 310 / ECON 307 PROBABILITY AND STATISTICS
Advanced Courses 5
CAAM 453 NUMERICAL ANALYSIS I
CAAM 454 NUMERICAL ANALYSIS II
or CAAM 471 LINEAR AND INTEGER PROGRAMMING
Design Project 6
CAAM 495 SENIOR DESIGN PROJECT I
CAAM 496 SENIOR DESIGN PROJECT II
Elective Requirements 7
Select 4 elective courses (see below for Highly Recommended Electives list)
Total Credit Hours Required for the Major in Computational and Applied Mathematics 49-52
Additional Credit Hours to Complete BA Degree Requirements 6-11

Footnotes and Additional Information

* Includes coursework completed as distribution credit, FWIS, LPAP, upper-level, residency (hours taken at Rice), 60 hours outside of the major (if applicable), and any additional academic program requirements. The “hours outside of the major” requirement may include all of the above university requirements.
1 The Introductory Courses requirement is typically fulfilled during the student’s first two years.
2 Students with prior experience with calculus may replace MATH 101 or MATH 105 with a 3-credit quantitative elective at the 200-level or above, as approved by a CAAM undergraduate advisor (this quantitative elective is in addition to the four electives required below). Entering students should enroll in the most advanced course commensurate with their background; advice is available from the CAAM department during Orientation Week.
3 The Intermediate Courses requirement is typically fulfilled by the end of the student’s third year.
Students who plan to pursue graduate studies in Computational and Applied Mathematics should take MATH 321 and MATH 302.

The Advanced Courses requirement is typically completed by the end of the student’s fourth year.

The Design Project requirement is typically fulfilled during the student’s fourth year.

To fulfill the remaining Computational and Applied Mathematics major requirements, students must complete 4 additional courses (12 credit hours) at the 300-level or above from the following departmental course offerings: Computational and Applied Mathematics (CAAM), Mathematics (MATH) or Statistics (STAT). At least 2 elective courses (6 credit hours) from the CAAM, MATH, or STAT courses selected must be at the 400-level or above (chosen in consultation with a Computational and Applied Mathematics undergraduate advisor). The elective courses completed must be taken for a minimum of 3 credit hours. Highly recommended electives may be found in the Highly Recommended Electives list below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAM 423 / MATH 423</td>
<td>PARTIAL DIFFERENTIAL EQUATIONS I</td>
<td>3</td>
</tr>
<tr>
<td>CAAM 519</td>
<td>COMPUTATIONAL SCIENCE I</td>
<td>3</td>
</tr>
<tr>
<td>CAAM 536 / CEVE 555</td>
<td>NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS</td>
<td>3</td>
</tr>
<tr>
<td>CAAM 560</td>
<td>OPTIMIZATION THEORY</td>
<td>3</td>
</tr>
<tr>
<td>CAAM 570</td>
<td>GRAPH THEORY</td>
<td>3</td>
</tr>
<tr>
<td>MATH 322</td>
<td>INTRODUCTION TO ANALYSIS II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 425</td>
<td>INTEGRATION THEORY</td>
<td>3</td>
</tr>
<tr>
<td>MATH 427</td>
<td>COMPLEX ANALYSIS</td>
<td>3</td>
</tr>
</tbody>
</table>

Highly Recommended Electives

Opportunities for the BA Degree with a Major in Computational and Applied 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 (ga.rice.edu/undergraduate-students/honors-distinctions/university) (summa cum laude, magna cum laude, and cum laude) and Distinction in Research and Creative Work (ga.rice.edu/undergraduate-students/honors-distinctions/university). Some departments have department-specific Honors awards or designations.

Professional Master’s 5th Year Degree Option for Rice Undergraduates

Rice students have an option to achieve the Master of Computational and Applied Mathematics (MCAAM) degree by adding an additional fifth year to their four undergraduate years of science and engineering studies.

Advanced Rice undergraduate students in good academic standing may apply during their junior year to the MCAAM professional degree program. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking required core courses of the MCAAM degree program during their senior year. A plan of study based on their particular focus area will need to be approved by the program director. Students should be aware there could be financial aid implications, if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).

Additional Information

For additional information, please see the Computational and Applied Mathematics website: http://www.caam.rice.edu/

Policies for the BA Degree with a Major in Computational and Applied Mathematics

Transfer Credit

For Rice University’s policy regarding transfer credit, see Transfer Credit (ga.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 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 Computational and Applied 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 Computational and Applied Mathematics website: http://www.caam.rice.edu/