

**Department of Computational and Applied Mathematics**  
**Rice University**  
<https://www.caam.rice.edu>

**CAAM BA**  
**Undergraduate Handbook<sup>1</sup>**

**1. Computational and Applied Mathematics**

Computational and Applied Mathematics is at the core of modern science, engineering, and business. The CAAM BA curriculum is designed to provide students with the fundamental knowledge underlying computational and applied mathematics, and to give students the flexibility to meet their individual needs and interests.

This handbook is intended to supplement the *General Announcements* <https://ga.rice.edu/programs-study/departments-programs/engineering/computational-applied-mathematics/computational-applied-mathematics-ba/>. In case there is conflicting information, university-wide regulations take precedence over department-wide regulations.

Connect with CAAM through <https://www.caam.rice.edu>, FACEBOOK <https://www.facebook.com/RiceCAAM/> and LinkedIn <https://www.linkedin.com/groups/4684667/>

**2. Curriculum**

The CAAM BA curriculum is split into required courses and electives. The required courses include six CAAM courses at 3 credits each and two CAAM courses at 2 credits each, as well as four MATH courses and one STAT course. The total of 37 credit hours is for required courses. Most students will have transfer credit for MATH 101, 102 from AP courses. Four approved courses at 3 credits each are required for the electives. The total credit hours from required and elective courses is 49.

These minimum requirements allow double CAAM+X majors to design a synergistic course of study that leverages the strengths of the individual majors. CAAM majors should build on these requirements and select additional courses to further strengthen their computational and mathematical foundations, and to enhance their mastery of certain fields of interest. When

---

<sup>1</sup> Document last updated Fall 2018

selecting courses, students should aim for the highest level possible. Especially students who intend to pursue an advanced degree should take more than the minimum requirements.

Students should plan their course of study with faculty who are major advisors.

**Required courses:**

- CAAM 210 (Fall and Spring): 3 credit hours
- CAAM 335 (Fall) or CAAM 334 (Spring): 3 credit hours
- CAAM 336 (Fall or Spring): 3 credit hours
- CAAM 378 (Fall): 3 credit hours
- CAAM 453 (Fall): 3 credit hours
- CAAM 454 (Spring) or CAAM 471 (Spring): 3 credit hours
- CAAM 495 (Fall): 2 credit hours
- CAAM 496 (Spring): 2 credit hours
- MATH 101: single variable calculus I
- MATH 102: single variable calculus II
- MATH 212: multivariable calculus
- MATH 302: elements of analysis; or MATH 321: introduction to Analysis I
- STAT 310: probability and statistics

**Elective courses:** Four electives are required: two at level 300 and higher, and two at level 400 and higher. At least two electives have to be CAAM courses. An elective has to be 3 credit (or higher). The highly recommended electives are:

- CAAM 423 (offered each Fall)
- CAAM 454 (offered each Spring) or CAAM 471 (offered each Spring) if the course is not already taken as required course requirement
- CAAM 519 (offered each Spring)
- CAAM 536 (offered each Spring)
- CAAM 560 (offered each Fall)
- CAAM 415 (when offered)
- CAAM 436 (when offered)
- CAAM 570 (when offered)
- CAAM 574 (when offered)
- CAAM 551 (when offered)
- CAAM 552 (when offered)
- CAAM 435 (when offered)
- CAAM 564 (when offered)
- CAAM 565 (when offered)

The CAAM BA degree allows up to two electives to be taken outside CAAM. For these two courses outside CAAM, at least one has to be at the 400-level or higher.

The following courses have been approved as CAAM electives:

- ELEC 436: Fundamentals of Control Systems
- ELEC 475: Learning from sensor data
- ELEC 478: Introduction to Machine Learning
- MATH 368: Combinatorics
- MATH 376: Algebraic Geometry
- MATH 410: Calculus of variation
- MATH 425: Integration theory
- MATH 523: Functional analysis
- STAT 410: Linear Regression
- STAT 482: Quantitative Financial Analytics
- STAT 413: Introduction to Statistical Machine Learning
- STAT 486: Market Models
- STAT 542: Simulation
- ECON 305: Game Theory and Other Micro Topics
- ECON 449: Principles of Financial Engineering
- ECON 470: Market Design
- MECH 420: Fundamentals of Control Systems
- COMP 314: Appl Algorithms & Data Structure
- COMP 330: Tools & Models – Data Science
- COMP 370: Evolutionary Bioinformatics
- COMP 382: Reasoning about Algorithms
- COMP 440: Artificial Intelligence
- COMP 441: Large-Scale Machine Learning
- COMP 481: Automata

Section 4 contains additional information on courses that are not allowed to count as electives.

**Independent study** (CAAM 490 or CAAM 491): If a student wants to count CAAM 490 or CAAM 491 as a CAAM elective, a paper or technical report that results from the work performed in the independent study should be submitted to the CAAM Undergraduate Committee for review and for approval. A maximum of one independent study can be counted as CAAM elective.

### 3. Double Majors

**Senior design requirement:** The CAAM senior design requirement is waived for double-majors if they have a two-semester senior design course for the other major. If the senior design course for the other major is one semester only, students have to take a 5<sup>th</sup> CAAM elective that is a CAAM course at the 300 level or higher.

#### 4. Additional Q&A

*Can MATH 331, Honors Analysis, be a substitute for MATH 302?* Yes.

*Can MATH 355 or MATH 354 be a substitute for CAAM 335?* Yes. MATH 355 or MATH 354 are not allowed to be counted as elective.

*Does CAAM 480 count as a CAAM elective?* No. Rice's policy does not allow students to be paid and to receive credit toward a degree at the same time.

*Can an independent study course outside of CAAM count as elective?* No. See paragraph on independent study in Section 2.

*Can MATH 322 or MATH 331 (honors analysis) or MATH 332 be a substitute for MATH 302 or MATH 321?* Yes. They cannot be counted as electives.

*Can STAT 418 be a substitute for STAT 310?* Yes

The following courses **cannot** be taken as CAAM electives:

- ELEC 450-MECH 450: Algorithmic Robotics
- MATH 382: Computational complex analysis
- MECH 417: Finite Element Analysis. Students should be encouraged to take CAAM 536/CAAM 552 for finite elements.
- MECH 454: Computational Fluid Mechanics. Students should be encouraged to take CAAM 536, 519, 520.
- COMP 361: Geometric Modeling
- STAT 405: Introduction to R
- MATH 321, 322, 331, 332, 355, 354: see questions above.