# COMPUTATIONAL SCIENCE

## Requirements

Any student may obtain a minor in Computational Science by taking the following courses:

- Five courses in foundational mathematics: MA 111 Calculus I, MA 112 Calculus II, MA 113 Calculus III, MA 221 Matrix Algebra & Differential Equations I, MA 222 Matrix Algebra & Differential Equations II
- Basic computing course: CSSE 120 Introduction to Software Development or departmental equivalent of at least 4 credit hours
- Introductory Computational Science courses:
  - MA 332 Introduction to Computational Science
  - MA 342 Computational Modeling
- Four credit hours of applied Computational Science course from list A
- Four credit hours of additional Computational Science course from list B

## List A: Applied Computational Science Courses

| Code | Title | Hours |
|---|---|---|
| MA 323 | Geometric Modeling | 4 |
| MA 439 | Mathematical Methods of Image Processing | 4 |
| MA 444 | Deterministic Models in Operations Research | 4 |
| CSSE 313 | Artificial Intelligence | 4 |
| CSSE 351 | Computer Graphics | 4 |
| CSSE 451 | Advanced Computer Graphics | 4 |
| CSSE 453 | Topics in Artificial Intelligence | 4 |
| CSSE 461 | Computer Vision | 4 |
| CSSE 463 | Image Recognition | 4 |
| ME 422 | Finite Elements for Engineering Applications | 4 |
| ME 427 | Introduction to Computational Fluid Dynamics | 4 |
| ME 522 | Advanced Finite Element Analysis | 4 |
| 4XX – Introduction to MEMS:Fabrication and Applications | | 4 |
| 5XX – Advanced Topics in MEMS | | 4 |
| ECE 420 | Discrete-Time Control Systems | 4 |
| ECE 480/OE 437 | Introduction to Image Processing | 4 |
| ECE 582/OE 537 | Advanced Image Processing | 4 |
| ECE 483 | DSP System Design | 4 |

## List B: Additional Computational Science Courses

| Code | Title | Hours |
|---|---|---|
| MA/CSSE 335 | Introduction to Parallel Computing | 4 |
| MA 433 | Numerical Analysis | 4 |
| MA 434 | Topics In Numerical Analysis | 4 |
| MA 446 | Combinatorial Optimization | 4 |
| CSSE 304 | Programming Language Concepts | 4 |
| CSSE 371 | Software Requirements Engineering | 4 |

Electives not on list A or B may be substituted with other courses with the approval of the area minor advisor.

The minor must be approved by the minor advisor for Computational Science and the student's advisor. The department has a form for the planning and approval of a minor.

## Notes and Limitations on Requirements

- Almost all students are required to take the five foundational courses as a requirement for their major
- Most majors should be able to apply the basic computing requirement and/or one of the elective courses towards their major.
- Math majors or double majors are not allowed to count MA 332 Introduction to Computational Science and MA 342 Computational Modeling for both the minor and the major.
- A student may not apply the four upper-division courses toward both this minor and a math or statistics minor.