MINOR IN SCIENTIFIC AND ENGINEERING COMPUTING

The Scientific and Engineering Computing minor provides undergraduate students with computational and numerical skills and knowledge to augment their studies in their major programs. Core courses in mathematics and computing provide broad, general skills in numerical methods, algorithms, and scientific software development. Elective courses provide depth in applying numerical computation to problems in the field of the student’s major.

Computational methods are now used routinely in virtually all fields of science and engineering, and are becoming more common in the social sciences. They have become essential to understand natural and human-created phenomena and systems. Computation has been described as the third paradigm for scientific discovery and innovation, along with theory and experimentation. A minor curriculum in computation is a natural complement to major programs in science, engineering and the social sciences.

Program of Study

A CS Minor application is required.

The Scientific and Engineering Computing computing minor must comprise at least 15 credit hours, of which at least 9 credit hours are upper-division coursework (numbered 3000 or above).

Prerequisites
Math through Calculus III and Differential Equations
CS 1331 Introduction to Object Oriented Programming 1

Required Courses
CX 4010 Computational Problem Solving for Scientists and Engineers 2,4 3

Numerical Methods
Select one of the following: 3
AE 3090 Numerical Methods for Aerospace Engineering
CHBE 2120 Numerical Methods in Chemical Engineering
CX 4640 Numerical Analysis I
MATH 4640 Numerical Analysis I
ME 2016 Computer Applications
MSE 3025 Statistics and Numerical Methods in Materials Science and Engineering

Intro to Parallel Computing
Select one of the following: 3
CX 4220 Introduction to High Performance Computing
CX 4777 Introduction to Parallel and Vector Scientific Computing
MATH 4777 Vector and Parallel Scientific Computation

Electives
Select two of the following: 6
AE 4040 Computational Fluid Dynamics
AE 4131 Introduction to Finite Element Methods
BMED 4783 Introduction to Medical Image Processing
CS 4710 Introduction to Computing Concepts for Bioinformatics
CX 4140 Computational Modeling Algorithms

Elective Courses for the minor:

- CX 4230 Computer Simulation
- CX 4240 Introduction to Computing for Data Analysis
- CX 4641 Numerical Analysis II
- CX 4777 Introduction to Parallel and Vector Scientific Computing
- CX 4803 Computational Sustainability
- ECE 4580 Computational Computer Vision
- ECE 4783 Introduction to Medical Image Processing
- ECE 4823 Computational Methods in Electrical Engineering
- ECE 4923 Advanced Programming Techniques for Engineering Apps
- MATH 4261 Mathematical Statistics I
- MATH 4305 Finite-dimensional Vector Spaces
- MATH 4581 Advanced Engineering Mathematics
- MATH 4641 Numerical Analysis II
- MATH 4777 Vector and Parallel Scientific Computation
- ME 4342 Computational Fluid Dynamics
- NRE 4234 Nuclear Criticality Safety Engineering
- PHYS 3266 Computational Physics

Total Credit Hours 15

1. CS 1331 is a pre-requisite for the minor and must be taken, but not included in the required 15 credit hours. A grade of A or B is required.
2. Computer engineering students should take both CX 4220 and CX 4777/MATH 4777 rather than CX 4010.
3. If Numerical Methods is required by the student’s Major, then the student may take an additional elective. Numerical Methods courses are restricted to taking AE 3090, CX 4640/MATH 4640, or MSE 3025

- No Special Problems or Internships coursework may be used towards the CS minor.
- A grade of A or B is required for CS 1331. All courses used to satisfy the course requirements for a minor must be completed with a grade of C (2.00) or better.
- All courses counting toward the minor must be taken on a letter-grade basis.
- A maximum of 3 credit hours of transfer credit may be used to satisfy the course requirements for a minor. This includes courses taken at another institution or credit earned through the AP or IB program, assuming the scores meet Georgia Tech minimum standards.
- It is the major advisor’s responsibility to verify that students are using only courses from the designated block(s) from the student’s major field of study that are allowed to satisfy a minor program, that they are not using any Core Area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Any free elective course used to satisfy the course requirements of the student’s major degree program may also be used to satisfy the course requirements for a minor.

Minor Program of Study & Guidelines (http://www.catalog.gatech.edu/academics/minors)