The University of Texas at Austin
Department of Statistics and Data Sciences
College of Natural Sciences

Certificate in Scientific Computation and Data Sciences Course Requirements (2018–2020 Catalog)

Policies and Procedures

- Total of 18 hours (six courses in sections II. – V. below) **must be completed with a grade of C- or higher**.
- No transfer credit or credit-by-exam may be used to fulfill certificate course requirements (except for prerequisite).
- Not all courses listed in this document are offered every semester. See UT course schedule for available class offerings.
- See SDS website for information on how to enroll and for more details about course and research project requirements: http://stat.utexas.edu/undergraduate/certificate-in-scientific-computation

I. Prerequisite Knowledge (*choose one*)

Mathematics: 408D Differential & Integral Calculus, 408M Multivariable Calculus

II. Core Requirements

A. Computer Programming (*choose one*)

Statistics & Data Sciences: 322 Intro to Scientific Programming
Aerospace Engineering: 301 Intro to Computer Programming
Biomedical Engineering: 303 Intro to Computing
Computer Science: 313E Elements of Software Design
Electrical Engineering: 312 Software Design & Implementation
Geological Sciences: 325J Programming in FORTRAN & MATLAB

B. Mathematics (*choose one*)

Statistics & Data Sciences: 329C Practical Linear Algebra I
Mathematics: 427 K Advanced Calculus for Applications, 340L Matrices & Matrix Calculations, 341 Linear Algebra & Matrix Theory

III. Scientific Computing Courses (*choose two categories & take one course in each*)

A. Numerical Methods

Statistics & Data Sciences: 335 Scientific & Technical Computing
Aerospace Engineering: 211K Engineering Computation
Civil Engineering: 379K Computer Methods for Civil Engineering
Chemical Engineering: 348 Numerical Methods in Chemical Engineering
Computer Science: 323E Elements of Scientific Computing, 323H Scientific Computing-Honors, 367 Numerical Methods
Mathematics: 348 Scientific Computation in Numerical Analysis, 368K Numerical Applications

B. Statistical Methods

Statistics & Data Sciences: 325H Honor Statistics, 320E Elements of Statistics, 328M Biostatistics
Biomedical Engineering: 335 Engineering, Probability, & Statistics
Economics: 329 Economic Statistics
Electrical Engineering: 351K Probability & Random Processes
Mathematics: 358K Applied Statistics, 378K Intro to Mathematical Statistics
Mechanical Engineering: 335 Engineering Statistics

C. Other Computing Topics

Statistics & Data Sciences: 329D Practical Linear Algebra II, 374C Parallel Computing, 374D Distributed & Grid Computing for Sci. & Engineers, 374E Visualization & Data Analysis
Computer Science: 324E Elements of Graphics & Visualization, 327E Elements of Databases, 329E Topics in Elements of Computing*****, 377 Principles & Applications of Parallel Programming

> ***Topics courses** must be approved by the faculty committee. See SDS website for details on approval process.

Continued on next page

The University of Texas at Austin
Department of Statistics and Data Sciences
College of Natural Sciences

Mathematics: 346 Applied Linear Algebra, 362M Introduction to Stochastic Processes, 372K PDE & Applications, 376C Methods of Applied Mathematics
Mechanical Engineering: 367S Simulation Modeling
Management Information Systems: 325 Database Management
Neuroscience: 366M Quantitative Methods

IV. Applied Computing Courses (choose <u>one</u>)

Statistics & Data Sciences: 322E Elements of Data Science, 348 Computation Biology & Bioinformatics
Aerospace Engineering: 347 Intro to Computational Fluid Dynamics
Biology: 321G Intro to Computational Bio, 377J Computational Biology Lab
Biomedical Engineering: 341 Engineering Tools for Computational Genomics Lab, 342 Computational Biomechanics, 346 Computational Structural Biology, 377T Topics in Biomedical Engineering*
Computer Science: 329E Topics in Elements of Computing*
Chemistry: 368 Advanced Topics in Chemistry
Economics: 363C Computational Economics
Electrical Engineering: 361M Introduction to Data Mining
Finance/Statistics (IROM): 372.6/372 Optimization Methods in Finance
Geological Sciences: 325K Computational Methods in Geological Sciences
Mathematics: 375T Topics in Mathematics*, 374M Mathematical Modeling in Science & Engineering
Physics: 329 Introduction to Computational Physics

*Topics courses must be approved by the faculty committee. See SDS website for details on approval process

V. Research Project (<u>One</u> course to reach 18 total hours for certificate)

Statistics & Data Sciences: 379R, 479R Undergraduate Research

Work with a faculty supervisor on an original research project that is presented in a research paper. Topics must be approved by SDS Faculty Committee prior to enrollment. Students are responsible for finding their own faculty supervisor. See our website for more information