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 Multivariable 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.*

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

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IV. Applied Computing Courses (choose one)

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

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V. Research Project (One 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.