

Undergraduate Academic Certificate in the Mathematics of Scientific Computation

The University of North Texas offers upper-division undergraduate academic certificates to meet workforce needs or to provide students with life/career skills and knowledge and to allow for specialization in academic disciplines. Academic certificates are special designations noted on a student's transcript and may be recorded on a student's transcript once all the requirements for the certificate have been completed.

Prerequisite Courses

- Math 1710 and 1720 (Calculus I and II)
- Math 2700 (linear algebra)

Required Courses

- CSCE 1020 or 1030 (1030 is recommended)
- Math 3310 or 3410 (differential equations)
- Math 3350 (numerical analysis)
- Three additional courses, including at least one mathematics and one non-mathematics course, from the list of courses on the back. Other courses may be allowed if approved in advance by an undergraduate advisor in the Department of Mathematics

Additional Recommended Courses

The following additional courses are recommended, but not required:

- CSCE 1040: Computer Science II
- Math 2730: Multivariable Calculus (a prerequisite course for many of the options on the back)

Approved advanced courses

In consultation with one of the undergraduate advisors in the mathematics department, students should choose three (generally advanced) courses concerning the mathematics of scientific computation. At least one of the courses must be taught in the mathematics department, and at least one of the courses must be taught outside the mathematics department. Common course selections are listed below. Prerequisites for courses below which are also prerequisites or required for the certificate are not listed again as prerequisites below.

Biology

BIOL 4810: Biocomputing (same as CSCE 4810; Prerequisite: CSCE 3850)

BIOL 4820: Computational Epidemiology (same as CSCE 4820; Prerequisite: CSCE 3850)

Chemistry

CHEM 4660: Computational Chemistry (Prerequisite: CHEM 3520 or consent of department)

Computer Science

CSCE 3010: Signals and Systems (same as EENG 2620; Prerequisite: EENG 2610 and MATH 2730 or 3310)

CSCE 3850: Computational Life Science (Prerequisite: CSCE 2050)

CSCE 4240: Digital Image Processing (Prerequisite: CSCE 3110)

CSCE 4810: Biocomputing (same as BIOL 4810; Prerequisite: CSCE 3850)

CSCE 4820: Computational Epidemiology (same as BIOL 4820; Prerequisite: CSCE 3850)

Electrical Engineering

EENG 2620: Signals and Systems (same as CSCE 3010; Prerequisite: EENG 2610 and MATH 2730 or 3310)

Engineering Technology

MEET 3940: Fluid Mechanics (Prerequisite: ENGR 2302)

MEET 3990: Applied Thermodynamics (Prerequisites: CHEM 1410/1430 and PHYS 1710/1730)

MEET 4350: Heat Transfer (Prerequisites: MEET 3940, CHEM 14010/1430 and PHYS 1710/1730)

Materials Science

MTSE 4040: Computational Materials Science (Prerequisites: MTSE 3010 and 3030)

MTSE 4070: Electronic Materials (Prerequisite: MFET 3450)

Mathematics (all students must choose at least one math and one non-math course)

Math 3420: Differential Equations II

Math 3740: Vector Calculus (Prerequisite: Math 2730)

Math 3850: Mathematical Modeling (taught as Math 4980 in Spring 2012 and Spring 2013)

Math 4100: Fourier Analysis (prior or concurrent enrollment in Math 2730 recommended)

Math 4200: Dynamical Systems (Prerequisite: Math 3000 and 3610)

Mechanical and Energy Engineering

MEEN 2210: Thermodynamics (Prerequisites: PHYS 1710/1730)

MEEN 3110: Applied Thermodynamics II (Prerequisites: CHEM 1415/1435 (or CHEM 1410/1430 and CHEM 1420/1440), MATH 2730, and MEEN 2210)

MEEN 3120: Fluid Mechanics (Prerequisite: Math 2730)

MEEN 3230: Dynamics, Vibrations, and Control (Prerequisites: MEEN 2130 (or ENGR 2301 and 2302))

Physics

PHYS 3310: Mathematical Methods (Prerequisite: PHYS 2220)

PHYS 4110: Statistical and Thermal Physics (Prerequisite: PHYS 3010/30)

PHYS 4210: Electricity and Magnetism (Prerequisite: PHYS 2220/2240)

PHYS 4600: Computer Based Physics (Prerequisite: PHYS 2220)