	Minimum Hrs Required	Course(s) Fulfilled
REQUIRED COURSEWORK: 18HRS TOTAL		
Two Core Courses:	6	
C S 303E: Elements of Computer Programming		
C S 313E: Elements of Software Design		
Four of the Following Upper Division Courses:	12	
C S 323E: Elements of Scientific Computing		
C S 324E: Elements of Graphics and Visualization		
C S 326E: Elements of Networking		
C S 327E: Elements of Databases		
C S 329E: Advanced Topics in Elements of Computing		

- Elements of Data Integration
- Elements of Data Visualization
- Elements of Mobile Computing
- Elements of Web Programming
- Elements of Data Analytics
- Elements of Game Development

C S 330E: Elements of Software Engineering I

C S 331E: Elements of Software Engineering II

toward the 12 additional hour requirement as long as topics vary

With the approval of the certificate program faculty committee, other appropriate upper division courses may be counted toward the elective requirement.

Please visit our website for a list of pre-approved substitute courses: http://www.cs.utexas.edu/undergraduate-program/academics/programming-and-computation

No more than 2 substititions are allowed to count toward the 18hr Programming and Computation Certificate

Multiple topics of C S 329E may count

POLICIES & PROCEDURES

- Application for admission required
- Total of 18 hours required; 12 of which must be upper division
- Students may only register for up to 3 upper division C S Elements courses in a given semester
- All coursework must be completed with a grade of C- or higher
- Please visit the certificate website for additional information:
  http://www.cs.utexas.edu/undergraduate-program/academics/programming-and-computation