

Erik Jonsson School of Engineering and Computer Science Interdisciplinary Programs

Software Engineering (B.S.S.E.)

Goals of the Software Engineering Program

The focus of the Software Engineering degree is to provide world class education in modern software engineering. The overall goals of the Bachelor of Science in Software Engineering Program are:

1. To prepare students for software engineering positions in industry or government.
2. To prepare students for graduate study in Software Engineering.
3. To provide a solid foundation in Computer Science and Software Engineering principles that will allow graduates to adapt effectively in a quickly changing field.

Educational Objectives of the Software Engineering Program

The current objectives for graduates of the Bachelor of Science in Software Engineering Program:

- Students should have a successful, long-lived, software engineering based career path
- Students should meet the needs of industry or academia
- Students should contribute to, and/or lead, software engineering based teams
- Students should actively pursue continuing (lifelong) learning

1.

Bachelor of Science in Software Engineering Degree Requirements (124 hours)

I. Core Curriculum Requirements¹: 42 hours

A. Communication (6 hours)

3 hours Communication ([RHET 1302](#))

3 hours Professional and Technical Communication ([CS 3390](#))²

B. Social and Behavioral Sciences (15 hours)

6 hours Government ([GOVT 2301](#) and [GOVT 2302](#))
6 hours American History
3 hours Social and Behavioral Science ([CS 3361](#))

C. Humanities and Fine Arts (6 hours)

3 hours Fine Arts ([ARTS 1301](#))
3 hours Humanities ([HUMA 1301](#))

D. Mathematics and Quantitative Reasoning (6 hours)

6 hours Calculus ([MATH 2413](#), [MATH 2414](#) or [MATH 2417](#), [MATH 2419](#))³

E. Science (9 hours)

6 hours Lecture courses ([PHYS 2325](#) and [PHYS 2326](#))
2 hours Laboratory courses ([PHYS 2125](#) and [PHYS 2126](#))
4 hours Science Elective⁴

¹ Curriculum Requirements can be fulfilled by other approved courses from accredited institutions of higher education. The courses listed in parentheses are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

II. Major Requirements: 67 hours

Major Preparatory Courses (18 hours beyond Core Curriculum)

ECS 1200 Freshman Experience Class⁶
[CS 1337](#) Computer Science I
[CS 2305](#) Discrete Mathematics for Computing I
[CS 2336](#) Computer Science II
[MATH 2413](#) Differential Calculus or [MATH 2417](#) Calculus I³
[MATH 2418](#) Linear Algebra
[MATH 2414](#) Integral Calculus or [MATH 2419](#) Calculus II³
[PHYS 2125](#) Physics Laboratory I⁴
[PHYS 2126](#) Physics Laboratory II⁴
[PHYS 2325](#) Mechanics⁴
[PHYS 2326](#) Electromagnetism and Waves⁴
4 hours Science Elective⁴

Major Core Courses (37 hours beyond Core Curriculum)

[SE 3306](#) Mathematical Foundations of Software Engineering
[SE 3340](#) Computer Architecture
[SE 3341](#) Probability and Statistics in Computer Science and Software Engineering
[CS 3345](#) Data Structures and Introduction to Algorithmic Analysis

[CS 3354](#) Software Engineering
[CS 3361](#) Social Issues and Ethics in Computer Science and Engineering⁵
[SE 3376](#) C/C++ Programming in a UNIX Environment
[CS 3390](#) Professional and Technical Communication²
[CS 4348](#) Operating Systems Concepts
[SE 4351](#) Requirements Engineering
[SE 4352](#) Software Architecture and Design
[SE 4367](#) Software Testing, Verification, Validation and Quality Assurance
[SE 4381](#) Software Project Planning and Management
[SE 4485](#) Software Engineering Project

Major Guided Electives (12 hours)

SE guided electives [are 4000](#) level CS/SE courses approved by the student's CS/SE advisor. The following courses may be used as guided electives without the explicit approval of an advisor:

[CS 4141](#) Digital Systems Laboratory
[CS 4314](#) Intelligent Systems Analysis
[CS 4315](#) Intelligent Systems Design
[CS 4334](#) Numerical Analysis
[CS 4337](#) Organization of Programming Languages
[CS 4341](#) Digital Logic and Computer Design
[CS 4349](#) Advanced Algorithm Design and Analysis
[CS 4352](#) Human Computer Interactions I
[CS 4353](#) Human Computer Interactions II
[CS 4361](#) Computer Graphics
[CS 4365](#) Artificial Intelligence
[CS 4375](#) Introduction to Machine Learning
[CS 4384](#) Automata Theory
[CS 4386](#) Compiler Design
[CS 4389](#) Data and Applications Security
[CS 4390](#) Computer Networks
[CS 4391](#) Introduction to Computer Vision
[CS 4392](#) Computer Animation
[CS 4393](#) Computer and Network Security
[CS 4394](#) Implementation of Modern Operating Systems
[CS 4395](#) Human Language Technologies
[CS 4396](#) Networking Laboratory
[CS 4397](#) Embedded Computer Systems
[CS 4398](#) Digital Forensics
[CS 4485](#) Computer Science Project
[EE 4325](#) Introduction to VLSI Design
[SE 4347](#) Database Systems
[SE 4376](#) Object Oriented Programming Systems
[SE 4399](#) Senior Honors in Computer Science/Software Engineering

Application Domains (9 hours)

An important aspect of Software Engineering education is the use of software engineering concepts in a particular application domain. Students should use two of their three guided electives to complete one of the applications domains below. Additional application domains may become available. Completing an application domain may require careful scheduling since many of these classes will not be offered every semester. It is strongly encouraged that you consult with an advisor.

Networks (9 hours)

[CS 4390](#) Computer Networks
[CS 4393](#) Computer and Network Security
[CS 4396](#) Networking Laboratory

Information Assurance (9 hours)

[CS 4389](#) Data and Applications Security
[CS 4393](#) Computer and Network Security
[CS 4398](#) Digital Forensics

Embedded Systems (9 hours)

[CS 4141](#) Digital Systems Laboratory
[CS 4341](#) Digital Logic and Computer Design
[CS 4397](#) Embedded Computer Systems
[CS 4348](#) Operating Systems Concepts

Computer Imaging (9 hours)

[CS 4361](#) Computer Graphics
[CS 4391](#) Introduction to Computer Vision
[CS 4392](#) Computer Animation

Artificial Intelligence and Cognitive Modeling (9 hours; take 3 of 5)

[CS 4314](#) Intelligent Systems Analysis
[CS 4315](#) Intelligent Systems Design
[CS 4365](#) Artificial Intelligence
[CS 4375](#) Introduction to Machine Learning
[CS 4395](#) Human Language Technologies

Human-Computer Interaction (9 hours)

[CS 4352](#) Human Computer Interactions I
[CS 4353](#) Human Computer Interactions II

CS 4361 Computer Graphics

² Hours fulfill the communication elective of the Core Curriculum.

³ Six hours of Calculus are counted under Mathematics Core, and two hours of Calculus are counted as Major Preparatory Courses.

⁴ Nine hours of Science are counted under Science Core. Three hours are counted as Major Preparatory Courses. Students should consult an advisor for specific classes that satisfy this requirement.

⁵ Hours contribute to the Social and Behavioral Sciences component of the Core Curriculum.

⁶ Required. 2 credit hours.

III. Elective Requirements: 15 hours

Advanced Electives (6 hours)⁷ All students are required to take at least six hours of advanced electives outside their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites.

Free Electives (11 hours) All students must accumulate at least 124 hours of university credit to graduate. Both lower- and upper-division courses may count as free electives but students must complete at least 51 hours of upper-division credit to qualify for graduation.

Degree programs in the Erik Jonsson School of Engineering and Computer Science are governed by various accreditation boards that place restrictions on classes used to meet the curricular requirements of degrees they certify. For this reason, not all classes offered by the University can be used to meet elective requirements. Please check with your academic advisor before enrolling in classes you hope to use as free electives.

⁷ Four credit hours can be satisfied by MATH2418 (Linear Algebra).

Fast Track Baccalaureate/Master's Degrees

In response to the need for post-baccalaureate education in the exciting field of software engineering, a Fast Track program is available to exceptionally well-qualified students who choose their courses carefully. At the end of five years of successful study, it is possible to earn both the B.S. degree in Software Engineering and the M.S. degree in Computer Science or the M.S. degree in Computer Science with Major in Software Engineering. Being within 30 hours of graduation, a student admitted to the graduate program and accepted into the Fast Track program may, during the senior year, take 15 graduate hours that may be used to complete the baccalaureate degree and also to satisfy the requirements for the master's degree.

Interested students should see the Associate Dean of Undergraduate Education (ADU) for specific admission requirements to the Fast Track program.

Honors Programs

The Department of Computer Science offers upper-division Honors for outstanding students in both the B.S. in Computer Science and B.S. in Software Engineering degree programs. These programs offer special sections of designated classes and other activities designed to enhance the educational experience of exceptional students. Admission to the Honors programs requires a 3.50 or better GPA in at least 30 hours of coursework. Graduation with Honors requires a 3.50 or better GPA and completion of at least 6 honors classes, including a Senior Thesis or Senior Design Project class. For more details, contact the Office of Undergraduate Advising (ECS South 2.502; 972-883-2004).

Departmental Honors with Distinction may be awarded to students whose Senior Thesis or Senior Design Project is judged by a faculty committee to be of exemplary quality. Only students graduating with Departmental Honors are eligible. Thesis/projects must be submitted by the deadline that applies to M.S. Theses and Ph.D. Dissertations in the graduating semester to allow for proper evaluation. Students interested in Honors with Distinction are encouraged to start working on their thesis/project a year prior to graduation.

Minors

A minor in Software Engineering requires 21 credit hours earned through the following courses:

- [CS 1337](#) Computer Science I
- [CS 2305](#) Discrete Mathematics for Computing I
- [CS 2336](#) Computer Science II
- [SE 3306](#) Mathematical Foundations of Software Engineering
- [CS 3345](#) Data Structures and Introduction to Algorithmic Analysis
- [CS 3354](#) Software Engineering
- [SE 43XX](#) Elective (any 4000-level organized SE class)