

Erik Jonsson School of Engineering and Computer Science

Department of Computer Science

Computer Science (B.S.) and Software Engineering (B.S.)

Faculty

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Associate Professors: Sergey Bereg, Lawrence Chung, Jorge A. Cobb, Kendra M.L. Cooper, Ovidiu Daescu, Sanda Harabagiu, Murat Kantarcioglu, Latifur Khan, Yang Liu, Neeraj Mittal, Vincent Ng, Ivana Page, Ravi Prakash, Kamil Sarac, Haim Schweitzer, S. Venkatesan, Yuke Wang, W. Eric Wong, W. Rym Zalila-Wenkstern

Assistant Professors: Mark Gabel, Vibhav Gogate, Xiaohu Guo, Kevin Hamlen, Zhiqiang Lin

Senior Lecturers: Tim Farage, Herman Harrison, Shyam Karrah, Feliks Klu niak, Linda Moraga, Greg Ozbirn, Miquel Razo-Razo, Cort Steinhorst, Janell Straach, Laurie Thompson, Jay Veerasamy

The Computer Science Department offers the B.S. degree in Computer Science and the B.S. degree in Software Engineering. Both are based on a solid foundation of mathematics, including calculus, linear algebra, and discrete mathematics. These programs of study are designed to offer students opportunities to prepare for an industrial, business, or governmental career in a rapidly changing profession and to prepare for graduate study in a field in which further education is strongly recommended. The two programs have the same basis in core computer science, including the analysis of algorithms and data structures, modeling, programming methodologies, and the study of operating systems. The Computer Science program continues with courses in advanced data structures, programming languages, telecommunications networks, and automata theory, while the Software Engineering program includes courses in requirements engineering, software validation and testing, and software architecture, culminating in a challenging capstone course in which students must demonstrate use of software engineering techniques. Both programs offer a rich choice of elective studies, including courses in artificial intelligence, computer graphics, database systems, and compiler design.

The school offers a "fast track" B.S. / M.S. option; see Fast Track Baccalaureate/Master's Degree Program

Mission of the Department of Computer Science

The mission of the Department of Computer Science is to prepare undergraduate and graduate students for productive careers in industry, academia, and government by providing an outstanding environment for teaching, learning, and research in the theory and applications of computing. The Department places priority on establishing and maintaining innovative research programs to enhance its education quality and make it an important regional, national and international resource center for discovering, integrating, and applying new knowledge and technologies.

Software Engineering (B.S.)

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:

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

Program Educational Objectives for Software Engineering

Within a few years after graduation, graduates of the Software Engineering Program should:

- Have a successful, long-lived, software engineering based career path
- Meet the needs of industry or academia
- Contribute to, and/or lead, software engineering based teams
- Actively pursue continuing (lifelong) learning

ABET Accreditation

The B.S. program in Software Engineering is accredited by the Engineering Accreditation Commission on Software Engineering, ABET, www.abet.org.

Bachelor of Science in Software Engineering

Degree Requirements (123 semester credit hours)

I. Core Curriculum Requirements¹: 42 semester credit hours

Communication (6 semester credit hours)

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

3 semester credit hours Professional and Technical Communication ([ECS 3390](#))²

Social and Behavioral Sciences (15 semester credit hours)

6 semester credit hours Government ([GOVT 2301](#) and [GOVT 2302](#))

6 semester credit hours American History

3 semester credit hours Social and Behavioral Science ([ECS 3361](#))

Humanities and Fine Arts (6 semester credit hours)

3 semester credit hours Fine Arts ([ARTS 1301](#))

3 semester credit hours Humanities ([HUMA 1301](#))

Mathematics and Quantitative Reasoning (6 semester credit hours)

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

Science (9 semester credit hours)

6 semester credit hours Lecture courses ([PHYS 2325](#) and [PHYS 2326](#))

2 semester credit hours Laboratory courses ([PHYS 2125](#) and [PHYS 2126](#))

4 semester credit hours Science Elective⁴

II. Major Requirements: 70 semester credit hours

Major Preparatory Courses (20 semester credit hours beyond Core Curriculum)

[ECS 1200](#) Introduction to Engineering and Computer Science⁵

[CS 1337](#) Computer Science I

[CS 2305](#) Discrete Mathematics for Computing I

[CS 2336](#) Computer Science II

[MATH 2413](#) Differential Calculus³

or [MATH 2417](#) Calculus I³

[MATH 2418](#) Linear Algebra

[MATH 2414](#) Integral Calculus³

or [MATH 2419](#) Calculus II³

[PHYS 2125](#) Physics Laboratory I⁴

[PHYS 2126](#) Physics Laboratory II⁴

[PHYS 2325](#) Mechanics⁴

[PHYS 2326](#) Electromagnetism and Waves⁴

4 semester credit hours Science Elective⁴

Major Core Courses (38 semester credit hours beyond Core Curriculum)

[SE 3162](#) Professional Responsibility in Computer Science and Software Engineering

[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

[ECS 3361](#) Social Issues and Ethics in Computer Science and Engineering⁶

[SE 3376](#) C/C++ Programming in a UNIX Environment

[ECS 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 semester credit 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 semester credit hours)

An important aspect of Software Engineering education is the use of software engineering concepts in a particular application domain. Students should use two or three of their 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 the classes will not be offered every semester. It is strongly encouraged that you consult with an

Networks (9 semester credit hours)

[CS 4390](#) Computer Networks

[CS 4393](#) Computer and Network Security

[CS 4396](#) Networking Laboratory

Information Assurance (9 semester credit hours)

[CS 4389](#) Data and Applications Security

[CS 4393](#) Computer and Network Security

[CS 4398](#) Digital Forensics

Embedded Systems (9 semester credit 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 semester credit hours)

[CS 4361](#) Computer Graphics

[CS 4391](#) Introduction to Computer Vision

[CS 4392](#) Computer Animation

Artificial Intelligence and Cognitive Modeling (9 semester credit 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 semester credit hours)

[CS 4352](#) Human Computer Interactions I

[CS 4353](#) Human Computer Interactions II

[CS 4361](#) Computer Graphics

III. Elective Requirements: 11 semester credit hours

Advanced Electives (6 semester credit hours)

All students are required to take at least six semester credit hours of advanced electives outside their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites. Four of these semester credit hours may be satisfied with [MATH 2418](#) Linear Algebra, which may be counted under Major Preparatory courses.

Free Electives (9 semester credit hours)

All students must accumulate at least 124 semester credit hours of university credit to graduate. Both lower- and upper-division courses may count as free electives but students must complete at least 51 semester credit 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 may be used to meet elective requirements. Please check with your academic advisor before enrolling in classes you hope to use as free electives.

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 semester credit 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 semester credit 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 3.500 or better GPA in at least 30 semester credit hours of coursework. Graduation with Honors requires a 3.500 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. Theses/projects must be submitted by the deadline that applies to Master'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 semester 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)

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.
2. Hours fulfill the communication elective of the Core Curriculum.
3. Six semester credit hours of Calculus are counted under Mathematics Core, and two semester credit hours of Calculus are counted as Major Preparatory Courses.
4. Nine semester credit hours of Science are counted under Science Core. Three semester credit hours are counted as Major Preparatory Courses. Students should consult an advisor for specific classes that satisfy this requirement.
5. Transfer students with sufficient background may petition to substitute upper level semester credit hours in the major for this class.
6. Hours contribute to the Social and Behavioral Sciences component of the Core Curriculum.

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