

Erik Jonsson School of Engineering and Computer Science

Department of Computer Science

Software Engineering (BS)

The Computer Science Department offers the [BS degree in Computer Science](#) and the [BS 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, modern 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 include courses in requirements engineering, software validation and testing, and software architecture, culminating in a challenging project 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, databases, and compiler design.

The school offers a "fast track" BS / MS 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 high 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.

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 allow 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:

- Pursue lasting and successful careers in software engineering or related fields including as industry professionals, educators, researchers, government professionals and/or entrepreneurs
- Be effective team contributors and/or leaders, including in multi-disciplinary environments, in professional fields related to software engineering
- Serve their profession in a socially responsible, ethical, and innovative manner to meet the software engineering needs of industry, academia, and/or society
- Continue to develop and grow through lifelong learning, and successfully adapt to continuous advancements in software technology

ABET Accreditation

The BS program in Software Engineering is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Bachelor of Science in Software Engineering

[Degree Requirements](#) (123 semester credit hours)¹

[View an Example of Degree Requirements by Semester](#)

Faculty

FACG> ecs-software-engineering-bs,ecs-computer-science-bs

Professors: Farokh B. Bastani, Sergey Bereg, Ovidiu Daescu, Yvo G. Desmedt, Ding-Zhu Du, Andrés Faragó, Paul Fishwick, Xiaohu Guo, Gopal Gupta, Zygmunt Haas, Kevin Hamlen, Sanda M. Harabagiu, Dung T. Huynh, Jason Jue, Murat Kantarcioglu, Latifur Khan, Andrian Marcus, Neeraj Mittal, Dan I. Moldovan, Sriraam Natarajan, Yu-Chung (Vincent) Ng, Tien Nguyen, Simeon C. Ntafos, Balakrishnan Prabhakaran, Ravi Prakash, Kamil Sarac, Haim Schweitzer, Bhavani Thuraisingham, W. Eric Wong, Weili Wu, I-Ling Yen, Rym Zalila-Wenkstern

Associate Professors: Feng Chen, Lawrence Chung, Jorge A. Cobb, Vibhav Gogate, Benjamin Raichel, Nicholas Ruozzi

Assistant Professors: Xinya Du, Emily Kyle Fox, Yunhui Guo, Shuang Hao, Rishabh Iyer, Kangkook Jee, Chung Hwan Kim, Jin Kim, Jessica Ouyang, Yapeng Tian, Shiyi Wei, Yu Xiang, Wei Yang

Professors Emeriti: R. Chandrasekaran, Ivor P. Page, William J. Pervin, Balaji Raghavachari, Ivan Hal Sudborough, Klaus Truemper, Subbarayan Venkatesan, Kang Zhang

Professors of Instruction: Ebru Cankaya, John Cole, Doug DeGroot, Timothy (Tim) Farage, Shyam Karrah, Pushpa Kumar, Nhut Nguyen, Greg Ozbirn, Miguel Razo-Razo, Jeyakesavan (Jey) Veerasamy

Associate Professors of Instruction: Sridhar Alagar, Gordon Arnold, Anjum Chida, Wei Pang Chin, Bhadrachalam Chitturi, Michael Christiansen, Chris I. Davis, Karen Doore, Neeraj Gupta, Khiem Le, Anarag Nagar, Mehra Nouroz Borazjany, Jalal Omer, Mark Paulk, Jason W. Smith, Laurie Thompson, James Willson, Nurcan Yuruk

Assistant Professors of Instruction: Eric Becker, Scott Dollinger, Serdar Erbatur, Ranran Feng, Omar Hamdy, Gity Karami, Kamran Khan, Karen Mazidi, Richard K. Min, Priya Narayanasami, Brian Ricks, Elmer Salazar, Meghana Satpute, Nidhiben Solanki, Srimathi Srinivasan, Yi Zhao

I. Core Curriculum Requirements: 42 semester credit hours²

Communication: 6 semester credit hours

[RHET 1302](#) Rhetoric³

[ECS 3390](#) Professional and Technical Communication³

Or select any 6 semester credit hours from [Communication Core](#) courses (see advisor)

Mathematics: 3 semester credit hours

[MATH 2413](#) Differential Calculus⁴

or [MATH 2417](#) Calculus I⁴

Or select any 3 semester credit hours from [Mathematics Core](#) courses (see advisor)

Life and Physical Sciences: 6 semester credit hours

[PHYS 2325](#) Mechanics⁵

[PHYS 2326](#) Electromagnetism and Waves⁵

Or select any 6 semester credit hours from [Life and Physical Sciences Core](#) courses (see advisor)

Language, Philosophy and Culture: 3 semester credit hours

Select any 3 semester credit hours from [Language, Philosophy and Culture Core](#) courses (see advisor)

Creative Arts: 3 semester credit hours

Select any 3 semester credit hours from [Creative Arts Core](#) courses (see advisor)

American History: 6 semester credit hours

Select any 6 semester credit hours from [American History Core](#) courses (see advisor)

Government/Political Science: 6 semester credit hours

[GOVT 2305](#) American National Government

[GOVT 2306](#) State and Local Government

Or select any 6 semester credit hours from [Government/Political Science Core](#) courses (see advisor)

Social and Behavioral Sciences: 3 semester credit hours

Select any 3 semester credit hours from [Social and Behavioral Sciences Core](#) courses (see advisor)

Component Area Option: 6 semester credit hours

[MATH 2417](#) Calculus I⁴

[MATH 2419](#) Calculus II⁴

[PHYS 2125](#) Physics Laboratory I⁵

Or select any 6 semester credit hours from [Component Area Option Core](#) courses (see advisor)

II. Major Requirements: 77 semester credit hours

Major Preparatory Courses: 27 semester credit hours beyond Core Curriculum

[ECS 1100](#) Introduction to Engineering and Computer Science⁶

[CS 1200](#) Introduction to Computer Science and Software Engineering

[CS 1436](#) Programming Fundamentals

[CS 1337](#) Computer Science I

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

[CS 2336](#) Computer Science II

MATH Sequence - Students may choose one of the following sequences:

I. [MATH 2413](#) Differential Calculus⁴

and [MATH 2414](#) Integral Calculus⁴

or

II. [MATH 2417](#) Calculus I⁴

and [MATH 2419](#) Calculus II⁴

[MATH 2418](#) Linear Algebra

[PHYS 2125](#) Physics Laboratory I⁵

[PHYS 2126](#) Physics Laboratory II

[PHYS 2325](#) Mechanics⁵

[PHYS 2326](#) Electromagnetism and Waves⁵

[RHET 1302](#) Rhetoric³

[SE 2340](#) Computer Architecture

3 semester credit hours of guided elective in mathematics. The following courses may be used as guided electives without the explicit approval of an advisor:

[MATH 2415](#) Calculus of Several Variables

[MATH 2420](#) Differential Equations with Applications

[MATH 2451](#) Multivariable Calculus with Applications

[MATH 3310](#) Theoretical Concepts of Calculus

[MATH 3311](#) Abstract Algebra I

[MATH 3321](#) Geometry

[MATH 3323](#) Elementary Number Theory

[MATH 3351](#) Advanced Calculus

[MATH 3397](#) Mathematical Problem Solving

[MATH 4332](#) Scientific Computing using Python

[MATH 4334](#) Numerical Analysis

[MATH 4381](#) Structure of Modern Geometry

[STAT 3355](#) Introduction to Data Analysis

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 3341](#) Probability and Statistics in Computer Science and Software Engineering

[SE 3345](#) Data Structures and Introduction to Algorithmic Analysis

[SE 3354](#) Software Engineering

[SE 3377](#) Systems Programming in UNIX and Other Environments

[ECS 3390](#) Professional and Technical Communication⁷

[SE 4347](#) Database Systems

[SE 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](#) Programming Language Paradigms

[CS 4341](#) Digital Logic and Computer Design

[CS 4349](#) Advanced Algorithm Design and Analysis

[CS 4352](#) Introduction to Human-Computer Interaction

[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 4376](#) Object-Oriented Design

[SE 4399](#) Senior Honors in Software Engineering

Any other organized SE 4300-level course

III. Elective Requirements: 4 semester credit hours

Free Electives: 4 semester credit hours

All students must accumulate at least 123 semester credit hours of university credit to graduate.

Both lower- and upper-division courses may count as free electives.

The plan must include sufficient upper-division courses to total 45 upper-division semester credit hours.

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 well-qualified UT Dallas undergraduate students. Qualified seniors may take up to 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 requirements.

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 an Honors Program called Computer Science Computing Scholars (CS²). (CS²) is an intense Bachelor of Science in Computer Science Degree Program created for exceptionally gifted students who wish to pursue a demanding course of study enriched throughout with research experiences. The Computing Scholars Program has a specially designed curriculum. Courses integrate discussion of current research, recent discoveries, and open problems into a rich logical progression of firmly related topics. Course numbers for the Core Curriculum Requirements and Major Requirements are the same as those for the Bachelor of Science in Computer Science, but Computing Scholars take honors versions of the following courses: [CS 1200](#), [CS 2305](#), [CS 2340](#), [CS 3305](#), [CS 3341](#), [CS 3345](#), [CS 3354](#), [CS 4141](#), [CS 4337](#), [CS 4341](#), [CS 4348](#), [CS 4349](#), and [CS 4384](#).

Admission to the program is mainly by nomination and invitation. Those invited to join the Computing Scholars Honors Program will have successfully completed a full and challenging high school curriculum, will have achieved high scores on the SAT or ACT tests, and will be about to graduate from high school, or equivalent, with high class rank.

Successful participants will graduate with the added distinction of a Computing Scholars Honors Diploma.

For more information about this program students should contact the Computer Science Department leadership.

Minors

Students will be expected to meet the normal prerequisites in courses making up the minor, and should maintain a minimum GPA of 2.000 on a 4.00 scale (C average).

Minor in Software Engineering

21 semester credit hours

Students majoring in Computer Engineering, Computer Science or Software Engineering cannot add a minor in Software Engineering.

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

[SE 3345](#) Data Structures and Introduction to Algorithmic Analysis

[SE 3354](#) Software Engineering

SE Elective (any 4000-level organized SE class)

Certificates

Certificate in Information Assurance

9 semester credit hours

A Certificate in Information Assurance is offered by the Department of Computer Science. It can be obtained by completing the following (as well as any required prerequisites):

[CS 4389](#) Data and Applications Security

[CS 4393](#) Computer and Network Security

[CS 4398](#) Digital Forensics

Students that complete the Minor in Information Assurance will not be awarded certificates in Information Assurance.

1. Incoming freshmen must enroll and complete requirements of UNIV 1010 and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.
2. Curriculum Requirements can be fulfilled by other approved courses. The courses listed are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.
3. Semester credit hours fulfill the communication component of the Core Curriculum.
4. Three semester credit hours of Calculus are counted under Mathematics Core, and five semester credit hours of Calculus are counted as Component Area Option Core.
5. Six semester credit hours of Physics are counted under Science core, and one semester credit hour of Physics (PHYS 2125) is counted as Component Area Option Core.
6. Transfer students with sufficient background may petition to substitute upper-division semester credit hours in the major for this class.
7. Semester credit hours fulfill the communication elective of the Core Curriculum.

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