Undergraduate Program Guide

Bachelor of Science

in

Computer Science

2017-2018

DEPARTMENT OF
COMPUTER SCIENCE and ENGINEERING

The University of Texas at Arlington

500 UTA Blvd.
Engineering Research Building, Room 640
P. O. Box 19015
Arlington, Texas 76019-0015

Phone (metro) -- (817) 272-3785
FAX (metro) -- (817) 272-3784
Homepage -- http://www.cse.uta.edu

Fall, 2017

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BSCS UNDERGRADUATE PROGRAM GUIDE

PURPOSE

This document has been prepared to assist the new or prospective student in understanding the undergraduate program in Computer Science (CS) offered by the University of Texas at Arlington.

The Undergraduate Catalog is the official source of university information. Each student should become familiar with it, and consult it for answers to questions regarding policies, regulations, and course descriptions. It is also important that all students watch for memos and notices posted on the CSE department bulletin boards and website that pertain to undergraduate students. These notices are of a current or real-time nature, dealing with required student actions or important opportunities.

PROGRAM OBJECTIVES

The BSCS program has been formulated so that graduates will: (1) enter the computing profession or advanced studies supported by their fundamental knowledge of mathematics, basic science, computing systems and science; (2) will advance in this profession supported by their ability to work in teams, analyze complex computing systems, design solutions and implement these solutions using computer software tools and technologies; and (3) demonstrate success and leadership while advancing the practice of computing by contributing to the growth of their employers, communities, and professional societies through their proficiency in communication, understanding of professional ethics and the ability to engage in continuing professional development.

PROGRAM OUTCOMES

From the educational objectives described above, the department designed the programs to meet the following Program Outcomes, to ensure that its graduates have:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and construct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global and societal context
- a recognition of the need for, and the ability to engage in, lifelong learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

This guide is not an official publication and the contents hereof are not official policy of The University of Texas at Arlington or of The University of Texas System. In all matters, the Rules and Regulations of the Regents of The University of Texas System, The Handbook of Operating Procedures of The University of Texas at Arlington, and the Undergraduate Catalog of The University of Texas at Arlington shall supersede this guide.

PROGRAM OVERVIEW

The computer science program started at UTA in the early 1970's as a master's program within the Industrial Engineering Department. A Ph.D. program began a few years later. The bachelor's degree was first offered in 1978.

A separate Department of Computer Science and Engineering was established in 1980, and the undergraduate program was accredited by the Accreditation Board for Engineering and Technology (ABET) in 1983, and has maintained its accreditation ever since. This was the first CSE undergraduate program to be accredited in the state. The program received accreditation from the Computing Sciences Accreditation Board (CSAB) in 1995, making it the first program in Texas accredited by both ABET and CSAB. In 2001 the CSE department started the Bachelor of Science in Computer Science degree and the Bachelor of Science in Software Engineering degree.

Our graduates are readily recruited by industry and can be found in exciting computer related positions throughout the area and the nation.

DEGREE REQUIREMENTS

The degree requirements for the Bachelor of Science in Computer Science (BSCS) degree are given below. The program is divided into two levels or subprograms: the pre-professional and the professional programs. Admission into the professional program requires a GPA of 2.25 or better in each of these categories: UTA overall, CSE courses, and CSE/Math/Science/Engineering courses. All pre-professional courses must be passed with at least a C grade. In addition, all co- and prerequisites for professional courses must be passed with at least a C grade.

Two four-hour freshman level foreign language courses in the same language are also required unless the student has completed at least two years of a foreign language in high school or English is his/her second language.

Pre-Professional Courses

English:	ENGL 1301
Mathematics:	MATH 1426 and 2425
Natural Science:	PHYS 1443 and 1444
Computer Science & Engr.:	ENGR 1300 and CSE 1105, 1320, 1325, 2100, 2312, 2315 and 2320

General Education Courses

Language, Philosophy & Culture:	3 hour approved Language, Philosophy & Culture elective (see page 8)
Component Area Option:	COMS 2302
Creative Arts:	3 hour approved creative arts elective (see page 9)
History:	HIST 1311 and 1312
Political Science:	POLS 2311 and 2312
Social & Behavioral Sciences:	IE 2308 or ECON 2305

Professional Courses

Computer Science & Engr.:	CSE 3302, 3310, 3315, 3320, 3330, 4308, 4314, 4316, 4317 and 4344 One of: CSE 4303, CSE 4305, CSE 4360
Industrial Engineering:	IE 3301 (or MATH 3313)
Mathematics:	CSE 3380 or MATH 3330, and a three hour approved math elective (see page 7)
Science:	4 hour approved science elective (see page 7)
Technical Electives:	12 hours of approved technical electives (see page 7)

Pre-Professional Total:	39 hours.
General Education Total:	24 hours.
Professional Total:	58 hours.

Total (for degree):	121 hours, plus modern and classical languages as required.

ADMISSION REQUIREMENTS

Requirements for admission as a Computer Science major are governed by the requirements stated under the College of Engineering section of the Undergraduate Catalog.

All entering students majoring in Computer Science are permitted to enroll in general education and pre-professional courses for which they are qualified. Students completing these pre-professional courses must meet the academic requirements specified by the College of Engineering prior to applying for admission to the professional program. The Computer Science and Engineering Department requires a 2.25 overall grade point average on a 4.0 scale in each of three categories: (1) overall, (2) required science, mathematics, and engineering courses, and (3) required CSE courses. Students not in the professional program will not be allowed entrance into any (4000) senior level courses.

PRIOR PREPARATION

The baccalaureate program in computer science, BSCS, is a four-year program, and requirements for the degree are based upon prior high school preparation through either an honors or college track. More specifically, entering students are expected to have a background in mathematics through pre-calculus, high school chemistry, and programming in a high-level language such as C, C++, Java or Python.

Students who have not had the appropriate preparation should contact the departmental advising office for assistance in structuring a degree plan that will include leveling courses. Students requiring leveling courses may require a longer period of time to complete their undergraduate program.

READINESS EXAMINATIONS

Students will be required to pass readiness examinations **before enrolling in the courses listed below** unless the course prerequisite was taken at U.T. Arlington and passed with a C or better grade. Students not passing the readiness examination must take the prerequisite course. A readiness examination may be taken only once per course and only before enrolling in any CSE courses. Additional information is available in the departmental office.

CSE 1320: Intermediate Programming
CSE 1325: Object-oriented Programming

STUDENT ADVISING

Computer Science (CS) majors are required to be advised by a departmental advisor each semester. Consult the departmental bulletin boards or Web site for advising hours. New and transfer students must also be advised prior to the beginning of the semester in which they first enroll.

TRANSFER STUDENTS AND TRANSFER CREDITS

After admission and prior to registration, transfer students should contact the Department of Computer Science and Engineering for advising. At the time of advising, a transfer student must present to their undergraduate advisor an official transcript (or copy) from each school previously attended. Only the equivalent courses in a program accredited by the Accreditation Board for Engineering and Technology (ABET), or equivalent freshman, sophomore, or general education courses accepted by the department chairperson can be counted toward a degree in computer science.

A student, once admitted to The University of Texas at Arlington and enrolled in the Computer Science (CS) program, cannot enroll in courses at another college or university and transfer those courses for credit toward a degree in Computer Science (CS) without having obtained prior permission from the Department of Computer Science and Engineering.

COOPERATIVE EDUCATION / INTERNSHIP PROGRAM

Cooperative Education (Co-op) programs are arrangements where students interleave periods of full-time industry employment with periods of full-time study, usually during the last two years of a degree program. Internships are either part time employment during the major academic semester or full time during the summer. The employment is directly related to the student's major and pays an attractive hourly rate. Thus, Co-op and internship students gain valuable career related experience before graduating while earning a meaningful income. Co-op education and internship opportunities are plentiful for Computer related majors.

HONORS PROGRAM

The Computer Science and Engineering department encourages qualified CS majors to participate in the Honors College described in the Undergraduate Catalog. Projects may be pursued in any one of the areas of research within the Department of Computer Science and Engineering.

GRADUATE DEGREE PATHS

Computing is a rapidly changing discipline requiring lifelong learning by its professionals. Completing a graduate degree enhances an individual's ability to apply their knowledge and skills to meet on the job challenges and the needs of society. Pursuing a graduate degree on a full-time basis immediately after completing the baccalaureate is an attractive option for many students. Students are encouraged to discuss possibilities with a Graduate Advisor upon advancement to a Bachelor of Science professional program.

Fast Track Program for Master's Degree

The Fast Track Program enables outstanding UT Arlington senior undergraduate students in Computer Science to satisfy degree requirements leading to a master's degree while completing their undergraduate studies. When senior-level students are within 15 hours of completing their undergraduate degree requirements, they may take up to 9 hours of graduate level coursework designated by the Computer Science and Engineering Program to satisfy both undergraduate and graduate degree requirements. This will be the maximum amount of credit that can be used as joint credit. In the limiting case, a student completing the maximum allowable hours (9) while in undergraduate status would have to take only 21 additional hours to meet minimum requirements for graduation in a 30 hour thesis degree program or 27 additional hours for a non-thesis degree program.

Interested UT Arlington undergraduate Computer Engineering students should apply to the Graduate Program when they are within 30 hours of completing their bachelor's degrees. They must have completed at least 30 hours at UTA, achieving a GPA of at least 3.25 in those courses, and have an overall GPA of 3.25 or better in all college courses. Additionally, they must have completed at least 18 hours of specified undergraduate foundation courses with a minimum GPA of 3.3 in those courses. Contact the Undergraduate Advisor or Graduate Advisor in Computer Science & Engineering for more information about the program.

Direct Acceptance to Doctoral Programs from Bachelor's Degree Program

Excellent undergraduate students may qualify for acceptance to doctoral studies without the intermediate completion of a master's degree. Students should discuss the expected level of commitment and possibilities for long-term support with a Graduate Advisor.

ELECTIVE COURSES

Courses that can be used to satisfy the various elective requirements in the CS curriculum are listed below by category. ***Please note that courses listed in more than one category may be used to satisfy the requirements of only one of those categories.***

Mathematics Electives

Any of the following courses may be used to satisfy the mathematics elective requirement. The use of any other course for the mathematics elective must be approved in advance by the lead undergraduate advisor. ***Consult the undergraduate catalog for course descriptions and prerequisites.***

MATH 2326 – Calculus III
MATH 3303 – Mathematical Game Theory
MATH 3304 – Linear Optimization Applications
CSE 4345 – Computational Methods

Science Electives

Any of the following courses may be used to satisfy the science elective requirement. The use of any other course for the science elective must be approved in advance by the lead undergraduate advisor. ***Consult the undergraduate catalog for course descriptions and prerequisites.***

BIOL 1441 - Cell and Molecular Biology
CHEM 1441 - General Chemistry
CHEM 1465 – Chemistry for Engineers

Technical Electives

Any of the following courses may be used to satisfy technical elective requirements. The use of any other course for a technical elective must be approved in advance by the lead undergraduate advisor. ***Consult the undergraduate catalog for course descriptions and prerequisites.***

CSE 4303 – Computer Graphics
CSE 4305 – Compilers for Algorithmic Languages
CSE 4309 – Introduction to Machine Learning
CSE 4310 – Introduction to Computer Vision
CSE 4319 - Modeling and Simulation
CSE 4321 – Software Testing and Maintenance
CSE 4322 – Software Project Management
CSE 4323 - Quantitative Computer Architecture
CSE 4331 - Database Implementation and Theory
CSE 4334 – Data Mining
CSE 4340 – Mobile Systems Engineering
CSE 4345 – Computational Methods
CSE 4351 - Parallel Processing
CSE 4360 - Autonomous Robot Design and Programming
CSE 4361 – Software Design Patterns
CSE 4378 – Introduction to Unmanned Vehicle Systems
CSE 4380 – Information Security
CSE 3311 – Object-Oriented Software Engineering
CSE 3313 – Introduction to Signal Processing
IE 3315 - Operations Research I

Language, Philosophy & Culture

Any of the following courses may be used to satisfy the language, philosophy & culture elective requirement. The use of any other course for the language, philosophy & culture elective must be approved in advance by the lead undergraduate advisor. ***Consult the undergraduate catalog for course descriptions and prerequisites.***

ANTHROPOLOGY (ANTH)
2322

ARABIC (ARAB)
2314

ARCHITECTURE (ARCH)
2300

ART & ART HISTORY (ART)
1317

CHINESE (CHIN)
2314

CLAS (INTRODUCTION TO CLASSICAL MYTHOLOGY)
1300

ENGLISH (ENGL)
2303 2309 2319 2329

FRENCH (FREN)
2314

GERMAN (GERM)
2314

GLOBAL (GLOBAL)
2301

GREEK (GREK)
2314

INTERDISCIPLINARY STUDIES (INTS)
1310

KOREAN (KORE)
2314

LATIN (LATN)
2314

LINGUISTICS (LING)
2371

PHILOSOPHY (PHIL)
1304 2300

PORTUGUESE (PORT)
2314

RUSSIAN (RUSS)
2314

SPANISH (SPAN)
2314

Creative Arts Electives

Any of the following courses may be used to satisfy the creative arts elective requirement. The use of any other course for the creative arts elective must be approved in advance by the lead undergraduate advisor. ***Consult the undergraduate catalog for course descriptions and prerequisites.***

ARCHITECTURE (ARCH)
1301

ART & ART HISTORY (ART)
1301 1309 1310

MUSIC (MUSI)
1300 1302 2300 2301

THEATER ARTS (THEA)
1342 1343