Undergraduate Program Guide

Bachelor of Science

in

Computer Science

2007-2008

DEPARTMENT OF
COMPUTER SCIENCE and ENGINEERING

The University of Texas at Arlington

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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 of each of its baccalaureate programs (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
PROGRAM OVERVIEW

Historically, the computer science program started at UTA in the early 1970’s as a master’s level program within the Industrial Engineering Department. A Ph.D. program was started 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. All pre-professional courses must be passed (math, science and computer science courses with at least a C grade), and a minimum UTA GPA of 2.25 must be earned before the student is admitted to the professional program.

Two four-hour freshman level foreign language courses 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

<table>
<thead>
<tr>
<th>English</th>
<th>ENGL 1301 and 1302.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>MATH 1426, 2425, and 2326.</td>
</tr>
<tr>
<td>Natural Science</td>
<td>PHYS 1443 and 1444.</td>
</tr>
<tr>
<td>Computer Science</td>
<td>CSE 1104, 1105, 1320, 1325, 2312, 2315, 2320.</td>
</tr>
</tbody>
</table>

General Education Courses

<table>
<thead>
<tr>
<th>Literature</th>
<th>3 hours of literature (English or modern and classical languages) or approved substitute.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberal Arts</td>
<td>COMS 3302.</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>3 hours of an approved fine arts elective (see page 11).</td>
</tr>
<tr>
<td>History</td>
<td>HIST 1311 and 1312.</td>
</tr>
<tr>
<td>Political Science</td>
<td>POLS 2311 and 2312.</td>
</tr>
<tr>
<td>Social/Cultural Studies</td>
<td>3 hours of an approved social or cultural elective (see page 9).</td>
</tr>
</tbody>
</table>

Professional Courses

<table>
<thead>
<tr>
<th>Computer Science</th>
<th>CSE 3302, 3310, 3315, 3320, 3322, 3330, 4308, 4316, and 4317.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Engineering</td>
<td>IE 3301 (or MATH 3313), and IE 3312.</td>
</tr>
<tr>
<td>Mathematics</td>
<td>MATH 3330 and 3 hours of an approved math elective (see page 8).</td>
</tr>
<tr>
<td>Science</td>
<td>4 hours of approved science electives (see page 9).</td>
</tr>
<tr>
<td>Technical Electives</td>
<td>12 hours of approved technical electives (see page 9).</td>
</tr>
</tbody>
</table>

Pre-Professional Total: 42 hours.
General Education Total: 24 hours.
Professional Total: 55 hours.
Total (for degree): 121 hours, plus modern and classical languages as required.
REPRESENTATIVE COURSE SEQUENCE

Freshman Year

**First Semester**
- CSE 1104 - Introduction to Engineering
- CSE 1105 - Introduction to CSE
- CSE 1320 - Intermediate Programming
- ENGL 1301 - Critical Thinking, Reading and Writing I
- MATH 1426 - Calculus I
- HIST 1311 - History of the United States

Total Credit 15 Hours

**Second Semester**
- CSE 1325 - Object-Oriented And Event-Driven Programming
- ENGL 1302 - Critical Thinking, Reading and Writing II
- MATH 2425 - Calculus II
- PHYS 1443 - Technical Physics
- HIST 1312 - History of the United States

Total Credit 17 Hours

Sophomore Year

**First Semester**
- CSE 2315 - Discrete Structures
- CSE 2312 - Computer Organization & Assembly Language Programming
- MATH 2326 - Calculus III
- PHYS 1444 - Technical Physics
- POLS 2311 - Government of the United States

Total Credit 16 Hours

**Second Semester**
- CSE 2320 - Algorithms & Data Structures
- IE 3301 - Engineering Probability
- MATH 3330 - Introduction to Matrices & Linear Algebra
- POLS 2312 - State & Local Government
- COMS 3302 – Professional and Technical Communication

Total Credit 15 Hours

Junior Year

**First Semester**
- CSE 3310 - Fundamentals of Software Engineering
- CSE 3315 - Theoretical Concepts in CSE
- CSE 3322 - Computer Architecture
- IE 3312 - Engineering Economy
- Literature Elective, 3 hours

Total Credit 15 Hours

**Second Semester**
- CSE 3302 - Programming Languages
- CSE 3320 - Operating Systems
- CSE 3330 - Database Systems & File Structures
- CSE 4308 – Artificial Intelligence
- Science elective, 4 hours

Total Credit 16 Hours

Senior Year

**First Semester**
- CSE 4316 – Computer System Design Project I
- Technical electives, 6 hours
- Math elective, 3 hours
- Social Cultural elective, 3 hours

Total Credit 15 Hours

**Second Semester**
- CSE 4317 – Computer System Design Project II
- Technical electives, 6 hours
- Fine Arts elective, 3 hours

Total Credit 12 Hours

TOTAL CREDIT HOURS = 121 hours, plus modern and classical languages as required.

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1 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.
COURSE OFFERINGS

All 1000- and 2000-level CSE courses are usually offered each semester and in the 11-week summer session. All 3000-level courses and required 4000-level courses are typically offered at least twice per year. Other 4000-level courses are typically offered only once per year unless there is a high demand. Refer to the CSE department bulletin boards or Web site for more specific and current information. The CSE department reserves the right to move students among equivalent sections of the same course.

ADMISSION REQUIREMENTS

Requirements for admission as a Computer Science pre-major or major are governed by the requirements stated under the College of Engineering section of the Undergraduate Catalog. Computer Science pre-majors become majors upon completion of 12 hours of required science, mathematics and CSE courses with a 2.25 or better grade point average.

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 Department of Computer Science and Engineering requires a 2.25 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 must have permission from the department chairperson to receive credit for courses listed in the professional program category. Application for admission to the professional program is made to the Department of Computer Science and Engineering. Application forms can be obtained from the departmental office or the advising Web page.

PRIOR PREPARATION

The baccalaureate program in computer science 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 or C++.

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. Additional information is available in the departmental office.

- CSE 1320: Intermediate Programming
- CSE 1325: Object-Oriented And Event-Driven Programming

STUDENT ADVISING

Computer Science pre-majors and majors are required to be advised by a departmental advisor each semester. Consult the departmental bulletin boards or Web site for advising hours. Continuing students are encouraged to submit advising requests via the CSE Web site. 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 program, cannot enroll in courses at another college or university and transfer those courses for credit toward a degree in computer science without having obtained prior written permission from the chairperson of the Department of Computer Science and Engineering.

COOPERATIVE EDUCATION PROGRAM

Cooperative education or "Co-op" programs are arrangements where students alternate periods of full-time employment with periods of full-time study, usually during the last two years of a degree program. The employment is directly related to the student's major and pays an attractive salary. Thus, Co-op students gain valuable career related experience before graduating while earning a meaningful income. Co-op opportunities are plentiful for CS students. A suggested course sequence for Co-op students is available in the department office.

HONORS PROGRAM

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

MASTER'S DEGREE PATH

Computer science is a rapidly changing field that requires professionals to continually update their knowledge and skills. Completing a master’s degree enhances an individual's ability to assimilate and apply their knowledge and skills to meet on the job challenges and the needs of society. Also, students whose career goals are research and development or university teaching are encouraged to obtain a master’s degree in route to the Ph.D. degree. Pursuing a master’s degree on a full-time basis immediately after completing the baccalaureate is an attractive option for many students.

CS honors students may structure their degree plans so that they can complete a master’s degree with four additional semesters of study. Those graduating with a 3.00 or higher GPA will be admitted to the department's master's program upon application.

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 (MEL)

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 department chairperson. Consult the undergraduate catalog for course descriptions and prerequisites.

- MATH 3300 - Introduction to Proofs
- MATH 3303 - Mathematical Game Theory
- MATH 3304 - Linear Optimization Applications
- MATH 3307 - Elementary Number Theory
- MATH 3315 - Mathematical Models
- MATH 3318 - Differential Equations
- MATH 3321 - Abstract Algebra
- MATH 3335 - Analysis I
- MATH 3345 - Numerical Analysis and Computer Applications
Science Electives (SEL)

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 department chairperson. Consult the undergraduate catalog for course descriptions and prerequisites.

- BIOL 1441 - Cell and Molecular Biology
- BIOL 1442 - Structure and Function of Organisms
- CHEM 1441 - General Chemistry
- CHEM 1442 - General Chemistry
- GEOL 1425 - Earth Systems
- PHYS 3445 - Optics

Technical Electives (TEEL)

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 department chairperson. The courses may be taken in any combination except that two or more must be 4000-level courses and three or more must be CSE courses. Recommended technical electives for the CS degree are indicated by an asterisk (*). Consult the undergraduate catalog for course descriptions and prerequisites.

- CSE 3442 - Embedded Computer Systems
- CSE 4301 - Contemporary Programming Practices
- CSE 4303 - Computer Graphics*
- CSE 4305 - Compilers for Algorithmic Languages*
- CSE 4308 - Artificial Intelligence*
- CSE 4310 - Software Engineering Processes
- CSE 4311 - Object-Oriented Software Engineering
- CSE 4312 - Formal Methods in Software Engineering
- CSE 4313 - Introduction to Signal Processing
- CSE 4319 - Modeling and Simulation
- CSE 4320 - Fundamentals of Telecommunications Software Development
- CSE 4321 - Software Testing
- CSE 4322 - Software Project Management
- CSE 4323 - Computer Architecture II
- CSE 4331 - Database Implementation and Theory*
- CSE 4342 - Real-Time Data Acquisition and Control Systems
- CSE 4344 - Computer Network Organization*
- CSE 4346 - Advanced Computer Networks
- CSE 4348 - Multimedia Systems*
- CSE 4351 - Parallel Processing*
- CSE 4353 - Distributed Computing*
- CSE 4360 - Autonomous Robot Design and Programming
- CSE 4361 - Software Design Patterns
- EE 3317 - Linear Systems
- IE 3315 - Operations Research I

Social/Cultural Electives (SCEL)

Any of the following courses may be used to satisfy the social/cultural elective requirement. The use of any other course for the social/cultural elective must be approved in advance by the department chairperson. Consult the Undergraduate Catalog for course descriptions, prerequisites and special considerations of credit.

ADVERTISING (ADVT)
- 2337

ANTHROPOLOGY (ANTH)
- 1306 2301 2322 3311 3323 3325 3328 3330 3331 3333 3336 3338 3343
- 3346 3350 3353 3355 3366 3369 4330 4342 4348
<table>
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<tr>
<th>Program</th>
<th>Courses</th>
</tr>
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<td>ARCHITECTURE (ARCH)</td>
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</tr>
<tr>
<td>ART HISTORY (ART)</td>
<td>4301</td>
</tr>
<tr>
<td>BIOLOGY (BIOL)</td>
<td>2317</td>
</tr>
<tr>
<td>BUSINESS ADMINISTRATION (BUSA)</td>
<td>2301</td>
</tr>
<tr>
<td>CLASSICS (CLAS)</td>
<td>1300 2307 2310 2320 3335</td>
</tr>
<tr>
<td>COMMUNICATION (COMM)</td>
<td>1300 4305 4315 4325 4335</td>
</tr>
<tr>
<td>EARLY CHILDHOOD EDUCATION (ECED)</td>
<td>2301</td>
</tr>
<tr>
<td>ECONOMICS (ECON)</td>
<td>2305 2337</td>
</tr>
<tr>
<td>ENGLISH (ENGL)</td>
<td>2309 2319 2329 3301 3306 3339 3340 3343 3351 3352 3370</td>
</tr>
<tr>
<td>FRENCH (FREN)</td>
<td>3311 3312 3316 3318</td>
</tr>
<tr>
<td>GEOGRAPHY (GEOG)</td>
<td>3350 3355 3371 4301 4310</td>
</tr>
<tr>
<td>GERMAN (GERM)</td>
<td>3301 3317 3318</td>
</tr>
<tr>
<td>HISTORY (HIST)</td>
<td>2301 2302 3308 3309 3310 3311 3312 3313 3314 3315 3316 3326 3342 3345 3352 3353 3360 3362 3365 3366 3367 3368 3370 3382 4354 4355 4366 4367 4368 4374 4375</td>
</tr>
<tr>
<td>HONORS (HONR)</td>
<td>2302 4310</td>
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<tr>
<td>HUMANITIES (HUMA)</td>
<td>2301 4301 4302</td>
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<td>KINESIOLOGY (KINE)</td>
<td>3307</td>
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<tr>
<td>LINGUISTICS (LING)</td>
<td>2301 3311 4317 4318</td>
</tr>
<tr>
<td>MUSIC (MUSI)</td>
<td>2300</td>
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<tr>
<td>NURSING (NURS)</td>
<td>3355</td>
</tr>
<tr>
<td>PHILOSOPHY (PHIL)</td>
<td>1300 1304 1310 2312 2313 3301 3302 3303 3304 3316 3319 3320 3321 4318 4388</td>
</tr>
<tr>
<td>POLITICAL SCIENCE (POLS)</td>
<td>3304 3305 3314 3316 3317 3318 4315 4317 4318 4319 4323 4336 4355 4361 4362 4363 4365 4387</td>
</tr>
</tbody>
</table>
PUBLIC RELATIONS (PREL)  
2338

PSYCHOLOGY (PSYC)  
2310  2317  3301  3310  3311  3312  3313  3315  3316

RUSSIAN (RUSS)  
3301  3306  3314  3322  3323

SOCIOMETRY (SOCI)  
1311  2312  3313  3317  3318  3320  3321  3322  3323  3326  3327  3328  3331  3334  3336  3340  3343  3346  3350  3351  3353  3356  3357  3360  4303  4309  4310  4315  4318  4320

SOCIAL WORK (SOCW)  
2311

SPANISH (SPAN)  
3302  3311  3312  3318  3320  3321

URBAN AND PUBLIC AFFAIRS (URPA)  
1301

WOMEN'S STUDIES (WOMS)  
2310  4318

Fine Arts Electives (FAEL)

Any of the following courses may be used to satisfy the fine arts elective requirement. The use of any other course for the fine arts elective must be approved in advance by the department chairperson. Consult the Undergraduate Catalog for course descriptions, prerequisites, and special considerations of credit.

ARCHITECTURE (ARCH)  
1301  2300  2303  2304  4305  4308  4309  4310

ART HISTORY (ART)  
1301  1309  1310  3302  3305  3306  3307  3308  3310  3311  3312  3313  3314  3315  3320  3325  3331  3389  3391  3392  4302  4303  4304  4306  4317  4330

CLASSICS (CLAS)  
2310  2320

DANCE (DNCE)  
1300

HONORS (HONR)  
2300

MUSIC (MUSI)  
1300  1301  1302  2300  2301  3300  3301

THEATER ARTS (THEA)  
1343  3307  4303