Undergraduate Program Guide

Bachelor of Science

in

Software Engineering

2008-2009

DEPARTMENT OF
COMPUTER SCIENCE and ENGINEERING

The University of Texas at Arlington

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BSSE UNDERGRADUATE PROGRAM GUIDE

PURPOSE

This document has been prepared to assist the new or prospective student in understanding the undergraduate program in Software Engineering (SE) offered by the University of Texas at Arlington.1

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 BSSE program has been formulated so that graduates will: (1) pursue the software engineering profession or advanced studies supported by their abilities to apply knowledge of mathematics, science, computer science and supporting disciplines, and software engineering; (2) advance in the software engineering profession supported by their abilities to effectively communicate and work in one or more significant application domains, function in multi-disciplinary teams, analyze, design, verify, validate, implement, and maintain software systems using software engineering technologies and tools; and (3) demonstrate success and leadership while advancing the practice of software engineering by contributing to the growth of their employers, communities, and professional societies through life-long learning, understanding professional ethics and responsibilities, and the impact of engineering solutions in a global and societal context.

In all three programs of study, design experiences are included throughout the first three years of the curriculum and culminate in a major team-oriented project in the senior year that approximates an industrial work experience. All programs strive to provide students with opportunities to interface with the profession through avenues such as cooperative education programs, professional society activities, plant trips, special projects, and industry speakers programs.

PROGRAM OUTCOMES

From the educational objectives described above, the department designed the program 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

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.
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 Software Engineering (BSSE) 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 software engineering 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

English: ENGL 1301 and 1302.
Mathematics: MATH 1426, 2425, and 2326.
Natural Science: PHYS 1443 and 1444.
Computer Science and Engineering: CSE 1104, 1105, 1320, 1325, 2312, 2315 and 2320

General Education Courses

Literature: 3 hours of literature (English or modern and classical languages) or approved substitute.
Liberal Arts: COMS 3302.
Fine Arts: 3 hours of an approved fine arts elective (see page 10).
History: HIST 1311 and 1312.
Political Science: POLS 2311 and 2312.
Social/Cultural Studies: 3 hours of an approved social or cultural elective (see page 9).

Professional Courses

Computer Science and Engineering: CSE 3302, 3310, 3315, 3320, 3322, 3330, 4310, 4311, 4321, 4322, 4316, 4317 and 4361.
Industrial Engineering: IE 3301 (or MATH 3313), and IE 3312.
Mathematics: MATH 3330.
Mathematics/Science: 6 hours of approved mathematics and science electives (see page 8).

Pre-Professional Total: 42 hours.
General Education Total: 24 hours.
Professional Total: 54 hours.
Total (for degree): 120 hours, plus modern and classical languages as required.
# REPRESENTATIVE COURSE SEQUENCE
## SOFTWARE ENGINEERING (SE)

### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CSE 1104 – Introduction to Engineering</td>
<td>CSE 1325 – Object-Oriented Programming in Java</td>
</tr>
<tr>
<td>CSE 1105 – Introduction to CSE</td>
<td>ENGL 1302 – Critical Thinking, Reading and Writing II</td>
</tr>
<tr>
<td>CSE 1320 – Intermediate Programming</td>
<td>MATH 2425 – Calculus II</td>
</tr>
<tr>
<td>ENGL 1301 – Critical Thinking, Reading and Writing I</td>
<td>PHYS 1443 – General Technical Physics I</td>
</tr>
<tr>
<td>MATH 1426 – Calculus I</td>
<td>HIST 1312 – History of the United States</td>
</tr>
<tr>
<td>HIST 1311 – History of the United States</td>
<td>Total Credit 17 Hours</td>
</tr>
<tr>
<td><strong>Total Credit 15 Hours</strong></td>
<td><strong>Total Credit 17 Hours</strong></td>
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### Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CSE 2315 – Discrete Structures</td>
<td>CSE 2320 – Algorithms and Data Structures</td>
</tr>
<tr>
<td>CSE 2312 – Computer Organization &amp; Assembly Language Programming</td>
<td>IE 3301 – Engineering Probability –</td>
</tr>
<tr>
<td>MATH 2326 – Calculus III</td>
<td>MATH 3330 – Introduction to Matrices &amp; Linear Algebra</td>
</tr>
<tr>
<td>PHYS 1444 – General Technical Physics II</td>
<td>POLS 2312 – State &amp; Local Government</td>
</tr>
<tr>
<td>POLS 2311 – Government of the United States</td>
<td>COMS 3302 – Professional and Technical Communication–</td>
</tr>
<tr>
<td><strong>Total Credit 16 Hours</strong></td>
<td><strong>Total Credit 15 Hours</strong></td>
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### Junior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CSE 3310 – Fundamentals of Software Engineering</td>
<td>CSE 3302 – Programming Languages</td>
</tr>
<tr>
<td>CSE 3315 – Theoretical Concepts in CSE</td>
<td>CSE 3320 – Operating Systems</td>
</tr>
<tr>
<td>CSE 3322 – Computer Architecture</td>
<td>CSE 4310 – Software Engineering Processes</td>
</tr>
<tr>
<td>IE 3312 – Engineering Economy</td>
<td>CSE 4311 – Object-Oriented Software Engineering</td>
</tr>
<tr>
<td>Math/Science Elective, 3 hours</td>
<td>Literature Elective, 3 hours</td>
</tr>
<tr>
<td><strong>Total Credit 15 Hours</strong></td>
<td><strong>Total Credit 15 Hours</strong></td>
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### Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CSE 3330 – Database Systems and File Structures</td>
<td>CSE 4317 – Computer System Design Project II</td>
</tr>
<tr>
<td>CSE 4321 – Software Testing and Maintenance</td>
<td>CSE 4361 – Software Design Patterns</td>
</tr>
<tr>
<td>CSE 4322 – Software Project Management</td>
<td>Math/Science Elective, 3 hours</td>
</tr>
<tr>
<td>CSE 4316 – Computer System Design Project I</td>
<td>Fine Arts Elective, 3 hours</td>
</tr>
<tr>
<td>Social/Cultural Elective, 3 hours</td>
<td><strong>Total Credit 12 Hours</strong></td>
</tr>
<tr>
<td><strong>Total Credit 15 Hours</strong></td>
<td><strong>Total Credit 12 Hours</strong></td>
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**TOTAL CREDIT HOURS = 120 hours, plus modern and classical languages as required.**
Required courses for a BS in Software Engineering (BSSE) (120 hrs)  
(2008-2009 catalog)  
(Revised: 06.23.2008 06:11pm, effective Fall 2008)

Prerequisite: MATH 1302  
Co-requisite: MATH 1323

Note: Required courses are in Bold

All Pre-Professional courses must be passed with a 'C' or better before being admitted to the Professional Division.

Pre-SE (42 hrs)  
Professional Division (54 & 2.25+)

MATH 1426  
MATH 2425  
MATH 2326

ENGL 1301  
ENGL 1302

HIST 1311  
HIST 1312  
POLS 2311  
POLS 2312  
3 hrs FineArts El  
3 hrs Soc/Cult El

NOTE: Required courses are in Bold
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 Software Engineering (SE) pre-major or major are governed by the requirements stated under the College of Engineering section of the Undergraduate Catalog. Software Engineering 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 Software Engineering 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 Software Engineering (SE) 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++ or Java.

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 Programming in Java

STUDENT ADVISING

Software Engineering (SE) 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 software engineering.
A student, once admitted to The University of Texas at Arlington and enrolled in the Software Engineering (SE) program, cannot enroll in courses at another college or university and transfer those courses for credit toward a Software Engineering (SE) degree 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 interleave 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. Cooperative education opportunities are plentiful for Software Engineering (SE) students.

**HONORS PROGRAM**

The Computer Science and Engineering department encourages qualified SE majors to participate in the 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.

**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 assimilate and 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.

**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 masters 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 SE 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/Science Electives (MSEL)**

Any of the following courses may be used to satisfy the mathematics/science elective requirement. The use of any other course for the mathematics/science elective requirement 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
- 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
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

ARCHITECTURE (ARCH)
2300

ART HISTORY (ART)
4301

BIOLOGY (BIOL)
2317

BUSINESS ADMINISTRATION (BUSA)
2301

CLASSICS (CLAS)
1300  2307  2310  2320  3335

COMMUNICATION (COMM)
1300  4305  4315  4325  4335

EARLY CHILDHOOD EDUCATION (ECED)
2301

ECONOMICS (ECON)
2305  2337

ENGLISH (ENGL)
2309  2319  2329  3301  3306  3339  3340  3343  3351  3352  3370

FRENCH (FREN)
3311  3312  3316  3318

GEOGRAPHY (GEOG)
3350  3355  3371  4301  4310

GERMAN (GERM)
3301  3317  3318

HISTORY (HIST)
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

HONORS (HONR)
2302  4310

HUMANITIES (HUMA)
2301  4301  4302

KINESIOLOGY (KINE)
3307
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