Department of Computer Science

Location: 201 Maes Building, (409) 880-8775

Chair: Stefan Andrei

Accreditation

The Bachelor of Science in Computer Science degree is accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board of Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700.

Mission Statement

The department will offer an education that is highly regarded by students, colleagues, industry, and other universities for its quality in teaching and in pure and applied research. We recognize that computer science requires a solid foundation in fundamental principles in order to prepare our graduates for continued learning and adaptation to the increasingly rapid changes likely to occur in information technology. Our department prepares its students for professional employment and graduate education through study and implementation of the fundamental principles of theory, abstraction, and software design, while at the same time presenting the ethical and social issues associated with computer science. We believe that the work environment should enable everyone involved to feel a sense of confidence, power, and self worth that will lead to the joyful pursuit of learning and effective teaching. We believe this environment is best fostered when there is a climate of collegiality and collaboration among the participants. We believe that integrity, honesty and trust are the foundation for success in any enterprise.

Objectives of the Computer Science Undergraduate Programs

1. Students of the Computer Science Program will develop professional skills and the necessary technical knowledge both in breadth and depth that prepare them for immediate employment or advanced study in computer science.
2. Graduates of the Computer Science Program will be prepared to employ mathematical tools, scientific principles, and fundamental knowledge of computer science to solve problems and work in multidisciplinary teams.
3. Graduates of the Computer Science Program will be aware of ethical and professional responsibilities and the need to engage in life-long learning.
4. Graduates of the Computer Science Program will have the communication, teamwork, and leadership skills necessary to function productively and professionally.

Computing Facilities

The Computer Science Department has six switched Ethernet laboratories attached to the gigabit-bandwidth campus network infrastructure through which Lamar University is connected to the Internet and World Wide Web. The equipment in the labs is abundant and available to all students. It is comprised of a diverse assortment of hardware and software running on dual processor AMD 64-bit workstations, Sun workstations, and servers and Intel-based PCs. The department offers image and video processing equipment for multimedia-related classes. Software for advanced courses and research in database, network simulation, symbolic computation, neural networks, continuous and discrete simulation, artificial intelligence and computer graphics can be readily accessed from servers. Wireless access to the Internet is in place within the Maes Building including the area where computer science offices are housed. The department also has high performance computing equipment for use with GPGPU programming and gaming.

Cooperative Education Program

The Department has had long-standing cooperative (COOP) programs with many companies and industries, both in Southeast Texas and around the state. This has proved to be an excellent program for both the students and the companies involved. The minimum requirements to be considered for a

College Pages

- College of Arts and Sciences
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COOP position are a GPA of at least 2.75, 30 hours college credit, and 9 hours credit in Computer Science. Some cooperative employers are DuPont, NASA, Texas Instruments, IBM, Texaco Research, and National Instruments. Students should apply during their sophomore year.

Degrees Offered

Bachelor of Science in Computer Science - 121 hrs
Bachelor of Science in Computer Information Science - 121 hrs
Minor in Computer Information Science Teacher's Certificate
Computer Science/MBA Track
Computer Information Science/MBA Track
MS Computer Science

Academic Policies of the Computer Science Department

In addition to the general university and college standards and policies stated in the Lamar University Catalog, the Computer Science Department enforces the following academic standards and policies:

1. In most cases, successful completion of a class requires a grade of C or better. There are two exceptions. CS and CIS majors are expected to make a B or better in COSC 1336 before taking COSC 1337. Similarly, a grade of B or better in COSC 1337 or COSC 3306 is required before taking COSC 2336.
2. Our majors are expected to be successful in their chosen discipline. Students who have attempted at least twelve hours of computer science courses and whose GPA in such courses drops below 2.00 will be required to declare another major. Students receiving a B.S. in CS or a B.S. in CIS will be required to have an overall GPA of at least 2.25 and a GPA in courses taken from the computer science department of at least 2.25.
3. Pursuant to university policy, full-time students must take English composition each long semester until the minimum requirements in those areas are satisfied. In addition, full-time students must also take mathematics each long semester until at least twelve (12) hours towards the degree is completed. Students are expected to have taken mathematics at least through pre-calculus or equivalent in high school.
4. No freshman student will be allowed to take any senior-level computer science course. A student may not register for the same class more than four times. If the student later drops the course or withdraws from school for that semester (receiving a “Q” or “W” for that course), the course counts as one attempt.

Bachelor of Science – Computer Science

The computer science program at Lamar is a broad-based program emphasizing the areas of programming languages, data structures, information systems, theory of programming languages, software engineering, networking, database, multimedia, applications of computer science, and computer architecture. The program requires 48 hours in computer science, 20 hours in mathematics, 12 hours in laboratory science, 3 hours in free electives, and 4 hours in electrical engineering as well as the general university requirements for a bachelor’s degree. Students are required to take the ETS Computer Science Field Exam during the semester in which they are graduating. This program is also offered online.

The student who completes this four-year academic program is awarded a Bachelor of Science degree in Computer Science and is well prepared to pursue a professional career as a computer scientist, or to pursue graduate work in computer science or in an area of related specialization. Advisor: Bo Sun.

The degree of Bachelor of Science in Computer Science will be awarded upon completion of the following requirements:

1. General Requirements: See **core curriculum**.
2. Mathematics: MATH 2413, 2305, 2414, 3370, 3328, 3351 or 3435.
3. Sciences: An approved Lab Science must be chosen from the following six courses: CHEM 1411, CHEM1412, BIOL 1406, BIOL 1407, PHYS 2425, PHYS 2426
4. ELEN 3431
5. Computer Science Requirements: 48 semester hours. COSC 1172, 1173, 1336, COSC 1337, COSC 2336, COSC 2372, COSC 3302, COSC 3304, COSC 3308, COSC 3325, COSC 4172, COSC 4302, COSC 4310, CPSC 3320, CPSC 4340, CPSC 4360. Note: A grade of "C" or better is necessary in required computer science courses with the following exceptions: a "B" or better in COSC 1336 is required before taking COSC 1337. Similarly, a grade of "B" or better in COSC 1337 or COSC 3306 is required before taking COSC 2336.
6. COSC/CPSC/ELEN Elective (6 semester hours) – COSC 2370, 4301, 4307, 4309, 4319, CPSC 3316, 4315, 4316, 4320, 4330, 4370; ELEN 3381, 4387, 4486, 4304.
7. Academic Elective – 3 semester hours. Any Lamar University course which offers semester credit hours is permitted.

Total: 121 semester hours

Note: Students are required to take the ETS Computer Science Field Exam during the semester in which they are graduating.

First Year	
Fall	*Spring*
COSC 1336, Fundamentals	COSC 1337, Fundamentals II
COSC 1173, CS 1 Lab	COMM or Modern Language
COSC 1172	Social Science
ENGL 1301	ENGL 1302 or 1374
MATH 2413	MATH 2305
PHIL 1370	PEGA
Second Year	
COSC 2336, Fundamentals III	COSC 2372
ENGL Literature	COSC 3304
MATH 2414	MATH 3328
Lab Science	Lab Science
American History I	American History II
Third Year	
ELEN 3431	COSC 3325
CPSC 3320	COSC 3302
COSC 3308	CPSC 4340
MATH 3370	MATH 3351 or 3435
Lab Science	Academic elective
Fourth Year	
COSC 4302	CPSC 4360
COSC/CPSC/ELEN elective	COSC 4310
Fine Arts	COSC/CPSC/ELEN elective
POLS 2301	COSC 4172
	POLS 2302

Comments:

1. Changes and substitutions must be approved by the department chair.
2. Second semester communication/modern language courses must be chosen from the following courses: COMM 1315, 1360, 2335, 2373, 3310, or 3340; or CMDS 2375; or an introductory modern language course.
3. Two semesters of US or Texas history from HIST 1301, 1302, 2373, 2374, 1361, 1362, 2377 or 2301.
4. Social Science Electives are: ECON 1301, PSYC 2301, ANTH 2346 or 2351, SOCI 1301, or (both ECON 2301 & ECON 2302).
5. Fine Arts Electives are: ARTS 1301, DANC 2304, HUMA 1315, MUSI 1306, or THEA 1310.
6. COSC/CPSC/ELEN courses may be taken as academic electives. The COSC/CPSC/ELEN electives are: COSC 2370, 4301, 4307, 4319; CPSC 4305, 4320, 4330, 4370; ELEN 3381 and 4387. Others, particularly ELEN 4304 require approval of the department chair.

Minor in Computer Science

Required courses for the minor in computer science are:

1. With a grade of "B" or above:
    1. COSC 1336 Principles of Computer Science I
    2. COSC 1337 Principles of Computer Science II
2. With a grade of "C" or above:
    1. COSC 2336 Data Structures
    2. CPSC 3320 Data Communications/Computer Networks

3. CPSC 4340 Database Design
4. COSC 4302 Operating Systems
5. COSC 4360 Software Engineering

The total number of credit hours for this minor is 21.

Computer Science/MBA Track

The Bachelor of Science in Computer Science program can prepare a student to complete the first year of the two years required to achieve an MBA in the College of Business. Thus, a student can receive a B.S. in Computer Science and an MBA within five years after the beginning of his/her study at Lamar. Utilizing the four electives for the B.S. in Computer Science and taking five additional courses, a student can complete the equivalent of the classes taken in the first year of the MBA.

The following courses required in business are necessary in addition to the computer science degree:

Economics 1301 (ECON 1301) must be selected as the core curriculum Social Science Elective, Business Analysis 3320 (BUAL 3320) Elective 1, Management 3310 (MGMT 3310) Elective 2, Management 3320 (MGMT 3320) Extra Course, Accounting 2301 (ACCT 2301) Extra Course, Accounting 2302 (ACCT 2302) Extra Course, Finance 3310 (FINC 3310) Extra Course, Marketing 3310 (MKTG 3310) Elective 3, Management Information Systems 3350 (BCOM 3350) Extra Course

Students who pursue this program can begin their second year of the MBA program immediately after graduation with a B.S. in Computer Science and admission to the MBA program. Admission to the MBA program requires the Graduate Management Admission Test (GMAT).

Bachelor of Science – Computer Information Science Program

The Computer Information Science program has an overall emphasis on information networking and technology. An interplay of knowledge from areas such as distributed computing, software engineering, expert systems, information retrieval and database management systems define the information technology concept. Information networks are becoming an integral and strategic component of such industries as petrochemicals, transportation, space technology, education, banking and finance, medical applications, manufacturing and retailing. Graduates of this program will possess an integrated set of skills from the fields of engineering, computer science and business.

The program requires 45 hours in computer science and computer and information sciences, 13 hours in mathematics, 24 hours in business and communications, 8 hours in laboratory science, and 6 hours of electives, as well as the general bachelor's degree requirements. Students are required to take the ETS Computer Science Field Exam during the semester in which they are graduating. Graduates of this program will be prepared to respond to the varied and changing needs of an information society. Such positions as Database Administrator, Network Manager, and Chief Information Officer are among the careers that are open to graduates in this field.

1. General Requirements: See **core curriculum**.
2. Mathematics and Science Requirements: MATH 2413, 2305, 1342 or 3370 or BUAL 3310, 3328. Lab Science (8 semester hours) – PHYS 1401 and 1402, CHEM 1411 and 1412, BIOL 1406 and 1407, or GEOL 1403 and 1404.
3. ECON 1301, ACCT 2301, MGMT 3310, ACCT 2302, MGMT 3320
4. Computer Science Requirements: 45 semester hours. COSC 1172, 1173, 1336, COSC 1337, COSC 3304, COSC 4172, COSC 4302, COSC 4330, COSC 4360, CPSC 3320, CPSC 4315, CPSC 4340, CPSC 4370 or COSC 4307. Note: A grade of "C" or better is necessary in required computer science courses with the following exception: a "B" or better in COSC 1336 is required before taking COSC 1337. Similarly, a grade of "B" or better in COSC 1337 or COSC 3306 is required before taking COSC 2336. Elective (3 semester hours) – COSC 3302, 3308, 3316, 3325, 4301, 4307, 4309, 4310, 4316, 4319, CPSC 4320, 4370.
5. Business Elective - 3 Semester Hours
6. Academic Elective – 6 semester hours. Any Lamar University course which offers semester credit hours is permitted.
7. Total: 121 semester hours

Note: Students are required to take the ETS Computer Science Field Exam during the semester in which they are graduating.

Fall	*Spring*
First Year	
COSC 1336, Fundamentals	COSC 1337, Fundamentals II
COSC 1173 CS 1 Lab	COMM or Modern Language
COSC 1172	ECON 1301
ENGL 1301	ENGL 1302 or 1374
MATH 2413	MATH 2305

PHIL 1370	PEGA
Second Year	
COSC 2336, Fundamentals III	COSC 2372
ENGL Literature	COSC 3304
MATH 1342, 3370 or BUAL 3310	MATH 3328
Lab Science	Lab Science
American History I	American History II
Third Year	
CPSC 4340	CPSC 4370 or COSC 4307
CPSC 3320	CPSC 4315
Academic elective	POLS 2302
ACCT 2301	MGMT 3310
POLS 2301	Academic elective
Fourth Year	
CPSC 4330 or COSC 4319	CPSC 4360
COSC or CPSC elective	COSC 4302
ACCT 2302	Academic elective
FINC 3310	COSC 4172
Fine Arts	MGMT 3320

Comments:

1. Changes and substitutions must be approved by the department chair.
2. COMM 1315, 1360, 2335, 2373, 3310, or 3340; or CMDS 2375; or an introductory modern language course.
3. Two semesters of US or Texas history from HIST 1301, 1302, 2373, 2374, 1361, 1362, 2377, or 2301.
4. Fine Arts electives are: ARTS 1301, DANC 2304, HUMA 1315, MUSI 1306, or THEA 1310.
5. Acceptable COSC/CPSC electives are: any of the alternative courses listed above as well as: COSC 3302, 3308, 3325, 4301, 4307, 4309, 4310, 4319, 4322, 4345; CPSC 4320 and 4370

Minor in Computer Information Science

Required courses for the minor in computer information science are:

1. With a grade of "B" or above:
    1. COSC 1336 Programming Fundamentals I
    2. COSC 1337 Programming Fundamentals II
2. With a grade of "C" or above:
    1. COSC 2336 Data Structures
    2. CPSC 3320 Data Communications/Computer Networks
    3. CPSC 4340 Database Design
    4. COSC 4302 Operating Systems
    5. CPSC Multimedia Processing

The total number of credit hours for this minor is 21.

Requirements for a Teacher's Certificate in Computer Information Science—Opt. I Specialization: (27 semester hours) COSC 1336, COSC 1337, COSC 2336, COSC 2372, COSC 3304, COSC 4302, CPSC 4340. Six hours from COSC 3308, COSC 4307, COSC 4309, CPSC 3320, CPSC 4330, MATH 2414, MATH 2305, MATH 2318, MATH 1342. —Opt. II Specialization: (27 semester hours) COSC 1336, COSC 1337, COSC 2336, COSC 2372, COSC 3304, COSC 3308, CPSC 4330, CPSC 4340, COSC 4302 or COSC 4310 or CPSC 3320.

For details concerning requirements for teacher certification and information on professional education

courses, consult the College of Education and Human Development section in this catalog.

Computer Information Science/MBA Track

The Bachelor of Science in Computer Information Science program can prepare a student to complete the first year of the two years required to achieve an MBA in the College of Business. Thus, a student can receive a B.S. in Computer Information Science and an MBA within five years after beginning of his/her study at Lamar. Seven courses from the College of Business are required for the B.S. in computer information science. By utilizing four electives for the B.S. in computer information science, the equivalent of the classes taken in the first year of the MBA can be completed during the bachelor's degree. The following seven courses are required for the Computer Information Science bachelor's degree: Economics 1301 (ECON 1301), Business Analysis I 3310 (BUAL 3310), Management 3310 (MGMT 3310), Management 3320 (MGMT 3320), Accounting 2301 (ACCT 2301), Accounting 2302 (ACCT 2302), Finance 3310 (FINC 3310).

If, in addition, the student uses the COSC/CPSC elective to take COSC 3325 (Computer Ethics and Law) and uses her/his other electives to take Business Analysis II 3320 (BUAL 3320), Marketing 3310 (MKTG 3310) and Management Information Systems 3350 (BCOM 3350), then the equivalent of the first year of MBA courses will have been completed. Students with a B.S. in computer information sciences who pursue this program can begin their second year of the MBA program immediately after graduation and admission to the MBA program. Admission to the MBA program requires the Graduate Management Admission Test (GMAT).

Minor in Multimedia and Web Technology

The required courses for the minor in web design program with a grade of "C" or above are:

1. COSC 1381 Game Programming
2. COSC 2330 Web 2.0
3. COSC 3320 Web Design
4. COSC 3323 Fundamentals of Digital Media
5. COSC 4320 Advanced Web Design
6. COSC 4332 Programming Mobile Devices

The total number of credit hours for this number is 18.

Graduate Program

The Department of Computer Science offers a program of study leading to the Master of Science degree in Computer Science. Both thesis and non-thesis options are available.

The objective of the master's degree is to produce professional computer scientists capable of contributing technically to the basic core areas of computer science as well as to application areas. A mixture of courses, laboratory, and research work in the program is designed to place graduates at the forefront of technical excellence.

Research

The department engages in a broad-based research program. Current faculty research interests include computer-aided geometric design, intrusion detection and computer security, artificial intelligence, wireless and sensor networks, theoretical computer science, and computer architecture.

Admission to the Graduate Program

Students seeking admission to this program must meet all general requirements of the College of Graduate Studies as listed in the bulletin of the College. Additional requirements are as follows:

1. Students must have a minimum combined score of greater than 1000 on the Verbal and Quantitative sections of the GRE with at least a score of 680 on the Quantitative section.
2. For applicants whose native language is not English, a TOEFL score of at least 550 is required. Students may be conditionally admitted, with the approval of the department chair, if they do not meet the TOEFL requirement, but do complete successfully the English requirements of the Texas Intensive English Program.
3. Demonstrated adequate background in programming a high-level modem language such as Java or C++, Data Structures, Operating Systems and Computer Architecture. Equivalency tests are offered for a fee to those students whose transcripts do not show convincing background knowledge in one or more of the areas mentioned above. Each test may be taken only once.
4. Students with minor deficiencies may be admitted to the program if these deficiencies can be removed within approximately one long semester. However, major deficiencies must be removed before a student is admitted to the degree program.
5. At least 15 hours of mathematics including differential and integral calculus, discrete mathematics and two other courses selected from statistics, linear algebra, abstract algebra, numerical analysis and differential equations.

Students not satisfying both conditions 1 and 2 will not be admitted to the computer science program. Those students who satisfy both conditions 1 and 2 but who are deficient in other areas may be provisionally admitted to the program and may enroll in graduate-level courses.

Admission to Candidacy

After removal of all deficiencies and upon completion of an additional 12 hours of graduate credit, the student is required to submit a formal degree plan to the Computer Science Graduate Advisor and the Dean of the Graduate Colllege. Every student must submit a G3 form to the Graduate Studies office before she/he completes the final nine hours of graduate credit in the degree plan. Admission to candidacy is granted by the Dean of the Graduate College after the degree plan has been approved.

Background Requirements

Students must be able to demonstrate sufficient undergraduate computer science background before beginning courses towards the M.S. program. The following undergraduate background courses or their equivalents are required: C++ and Unix (COSC 3306), Data Structures (COSC 2336), Operating Systems (COSC 4302), and Computer Architecture (COSC 4310). These prerequisites can be taken at the same time as required graduate courses, but they do not count toward the graduate degree.

Students must make at least a “B” grade in all prerequisite courses in order to satisfy the undergraduate background requirements.

Students may be excused from a prerequisite course if they are able to pass a competency exam given on the content of the associated course. Before each semester a competency test is given for each prerequisite course by the Computer Science Department for a fee of $75 per examination. Each examination may be taken only once, but examinations do not have to be taken before the first semester of enrollment. The tests can be taken later in the student’s program, but courses requiring one or more of the four prerequisite courses, mentioned above, cannot be taken unless either the prerequisite course has been completed successfully or the corresponding competency test has been passed. In some cases, students may also be excused from a prerequisite course if they have courses on their transcripts that the Computer Science Department considers equivalent in content to the prerequisite. The content of courses taken in other institutions is not necessarily the same as courses taken with the same title in Lamar University. We are not interested in having students take extra courses, but we do have to ensure the soundness of our graduate-level courses.

In addition to the prerequisites, our M.S. program requires either 9 graduate courses and a thesis or 11 courses and a one-semester project. In both cases, an oral defense is required in addition to a written report. If you are a full-time student taking nine credit hours (i.e. three courses) during the fall and spring semesters and one course during each of the two five-week summer sessions, you will finish all of your work within two years.

Degree Requirements

Students in the master’s program in Computer Science are required to establish competence in several areas considered basic to the field of Computer Science. At least 28 hours of graduate work in computer science and a thesis or project are required for a master’s degree in Computer Science. In order to qualify for the master’s degree, the student must have a 3.0 GPA in all computer science courses and must earn a grade of B or better in each of the core courses.

1. Core Course Requirement (6 courses; 16 semester hours). COSC 5100 Graduate Seminar, COSC 5313 Analysis of Algorithms, COSC 5302 Advanced Operating Systems, COSC 5328 Computer Networks, COSC 5315 Foundations of Computing, CPSC 5360 Software Engineering.
2. Option I (Thesis) Completion of the core requirements. Students may take one or two courses outside of computer science with the approval of the department chair. At least a “B” (3.0) grade point average must be maintained in course work. At most three “C” grades are permitted in coursework, and each “C” must be balanced by an “A” in another computer science graduate-level course. Students may not count courses taken in other departments to balance “C” grades made in the Computer Science Department. Completion of COSC 5390 and 5391 and submission of an acceptable thesis. Completion of a total of 34 graduate semester hours. Successful oral defense of the thesis. If failure occurs, the defense may be repeated. A second failure will cause the student to be dropped from the degree program in Computer Science.
3. Option II (Non-thesis) Completion of the core requirement. Students may take one or two courses outside of computer science with the approval of the department chair. At least a “B” (3.0) grade point average must be maintained in course work. At most three “C” grades are permitted in coursework, and each “C” must be balanced by an “A” in another computer science graduate level course. Students may not count courses taken in other departments to balance “C” grades made in the Computer Science Department. All non-thesis students must take and satisfactorily complete COSC 5369. This course consists primarily of a significant software project, an oral defense, and the submission of a written professional report. Completion of a total of 37 hours in graduate-level courses, including the final project. Successful completion of a comprehensive examination, which may be written, oral, or a combination of both upon determination of the Computer Science faculty. This comprehensive exam will cover the five core areas and may also include a programming component. Failure to pass this examination in two attempts will result in the student being dropped from the degree program in Computer Science.

Computer Science Specialization Areas and Courses

Artificial Intelligence: CPSC 5370, COSC 5312, COSC 5318

Graphics: COSC 4319, CPSC 5330, COSC 5321, COSC 5335

Simulation/Modeling: COSC 5309, COSC 5336, COSC 5310

Software Engineering: CPSC 5360, COSC 5331

Database: CPSC 5340, COSC 5311, COSC 5332, COSC 5333

Architecture/Algorithms: COSC 5308, COSC 5310, COSC 5350, COSC 5313

Computer Networks: CPSC 5320, COSC 5328, COSC 5335, COSC 5345

Symbolic Computation and Geometric Design: COSC 5348, COSC 5335

Distributed Systems: COSC 5333, COSC 5302, COSC 5350, CPSC 5328

Alternate Work/Study

An enrolled student may alternate between study and employment as a formal part of her/his training. While working, the student might perform research and collect data for his/her thesis at a facility that offers technology not available at Lamar University. A letter from the student's academic advisor explaining why he or she is unable to conduct research on campus and must go to another research facility is required. Only students doing a thesis are eligible for alternate work/study.