

Course and Subject Guide

The “Course and Subject Guide,” found in the Courses of Instruction section of this book, serves as a table of contents and provides quick access to subject areas and prefixes.

Department of Computer Science and Engineering

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Krishna M. Kavi, Chair

Faculty

Professors Buckles, Kavi, Parberry, Renka, Shahrokhi, Swigger. *Associate Professors* Brazile, Jacob, Mikler, Sweany, Tarau, Tate. *Assistant Professors* Akl, Dantu, Huang, Irby, Li, Mihalcea, Mohanty, Oh, Yuan. *Visiting Assistant Professor* Garlick. *Lecturers* Dollinger, Keathly, Retzlaff.

Introduction

The Department of Computer Science and Engineering at the University of North Texas provides very high quality educational programs by maintaining a balance between theoretical and experimental aspects of computer science, as well as a balance between software and hardware issues, and by providing curricula that serve the citizens and industrial organizations of Texas in general, and those in North Texas in particular. The department facilitates a collegial atmosphere that is conducive to intellectual and scholarly pursuits of the faculty and students. The department strongly encourages interdisciplinary research.

At present, the department offers bachelor of arts, bachelor of science, master of science and doctoral degrees all with a major in computer science; and bachelor of science and master of science degrees, both with a major in computer engineering. The department includes 22 tenured or tenure-track professors and three full-time lecturers. Current

research interests of the faculty include theoretical computer science, databases, game programming, wired and wireless networks, computer security, artificial intelligence, natural language processing, computer systems architecture, agent based systems, collaborative learning, parallel and distributed processing, numerical analyses, wireless communication, image understanding, sensor fusion, data mining, evolutionary computation, computational epidemiology, VLSI design, medical imaging, compilers, algorithm analyses, human factors, cryptography, image processing, and bioinformatics. The departmental research is supported by federal and state agencies as well as industrial concerns.

Vision and Mission

The vision of the Department of Computer Science and Engineering is to be a recognized leader for quality education and research in selected areas in computer science and engineering. The vision will be achieved by recruiting high caliber faculty and students, and by continuously improving on the curricula and teaching methods. The department aims to establish research and educational collaborations with international institutions of higher education. The department facilitates a collegial atmosphere that is conducive to intellectual and scholarly pursuits of the faculty and students. The department strongly encourages interdisciplinary research.

The mission of the Department of Computer Science and Engineering is to provide high quality education through its undergraduate and graduate degree programs in computer science and computer engineering, as well as to conduct nationally recognized research in selected areas of computer science and engineering. The BA with a major in computer science provides high quality education in computer science in a liberal arts setting. The BS with a major in computer science and the BS with a major in computer engineering provide very high quality education by maintaining a balance between theoretical and experimental aspects of computer science and computer engineering, as well as a balance between software and hardware issues, and by providing curricula that serve the citizens and industrial organizations in Texas in general, and those in North Texas in particular. The graduate programs, including the MS with a major in computer science, the MS with a major in computer engineering and the PhD with a major in computer science, provide very high quality educational experience in theoretical and experimental aspects of computer science and computer engineering by providing curricula that serve the citizens and industrial organizations and research institutions in Texas and the United States.

Programs of Study

The department offers undergraduate and graduate programs in the following areas:

- Bachelor of Arts,
- Bachelor of Science,
- Master of Science, and
- Doctor of Philosophy, all with a major in computer science;
- Bachelor of Science, and
- Master of Science, both with a major in computer engineering.

Bachelor of Arts with a Major in Computer Science

The Bachelor of Arts degree with a major in computer science is designed to provide a broad education so that the student can take advantage of a variety of professional opportunities.

Degree Requirements

1. **Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 42 must be advanced, and fulfillment of degree requirements for the Bachelor of Arts degree as specified in the “General University Requirements” in the Academics section of this catalog, and “Engineering Requirements” as specified in the College of Engineering section of this catalog.
2. **Major Requirements:** 30 semester hours of computer science, including CSCE 1030, 1040, 2050, 2610, 3110 and 3600. At least 18 hours must be in advanced courses, 12 of which must be taken at UNT. A maximum of 6 hours of credit in CSCE 4890, 4910, 4915, 4930, 4940 or 4950 will count toward this degree.
3. **Other Course Requirements:**
 - a. MATH 1710, Calculus I; MATH 2770, Discrete Mathematical Structures
 - b. 12 hours of laboratory science chosen from: PHYS 1710/1730, 2220/2240, 3010/3030, BIOL 1710/1730, 1720/1740, ARCH 2800, GEOG 1710, GEOL 1610, CHEM 1410/1430, 1420/1440.
 - c. EENG 2710, Digital Logic Design
4. **Minor:** Optional.
5. **Electives:** See four-year plan.
6. **Other Requirements:** A GPA of at least 2.75 on all advanced computer science courses.

BA with a Major in Computer Science

Following is one suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

FALL	HOURS
CSCE 1030, Computer Science I	4
ENGL 1310, College Writing, or ENGL 1313, Computer Assisted College Writing I*	3
LANG 2040, Foreign Language (intermediate)	3
MATH 1650, Pre-Calculus (prerequisite for MATH 1710)	5
Total	15

SPRING	HOURS
CSCE 1040, Computer Science II	3
ENGL 2700, Technical Writing*	3
LANG 2050, Foreign Language (intermediate)	3
PSCI 1040, American Government*	3
Social and Behavioral Sciences*	3
Total	15

SOPHOMORE YEAR

FALL	HOURS
CSCE 2050, Computer Science III	3
ENGR 2060, Professional Presentations (may be used to satisfy Communication requirement**)	3
EENG 2710, Digital Logic Design	3
MATH 1710, Calculus I	4
Humanities*	3
Total	16

SPRING	HOURS
MATH 2770, Discrete Mathematical Structures	3
PSCI 1050, American Government*	3
CSCE Option	1
Elective (advanced)	3
Elective (advanced)	3
Literature**	3
Total	16

JUNIOR YEAR

FALL	HOURS
CSCE 2610, Computer Organization	3
CSCE 3110, Data Structures and Algorithms	3
HIST 2610, United States History to 1865*	3
Natural Sciences**	4
Wellness*	3
Total	16

SPRING	HOURS
CSCE 3600, Principles of Systems Programming	3
HIST 2620, United States History Since 1865*	3
Cross-Cultural, Diversity and Global Studies*	3
Elective (advanced)	3
Natural Sciences**	4
Total	16

SENIOR YEAR

FALL	HOURS
CSCE Option (advanced)	4
Elective (advanced)	3
Elective (advanced)	3
Laboratory Science**	4
Visual and Performing Arts*	3
Total	17

SPRING	HOURS
CSCE Option (advanced)	3
CSCE Option (advanced)	4
Elective (advanced)	3
Elective (advanced)	3
Elective (advanced)	3
Total	16

**See the University Core Curriculum section of this catalog for approved list of course options.*

*** See College of Engineering degree requirements section of this catalog for approved list of course options.*

Actual degree plans may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

Students may wish to use opportunities for electives to complete a minor of their choice.

Bachelor of Science with a Major in Computer Science

The Bachelor of Science degree with a major in computer science is a professional degree designed to prepare the student for a career of further studies in the technology and application of computers. The BS degree requires more course work in computer science, mathematics and technical writing than the BA degree.

The Bachelor of Science degree with a major in computer science is accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET), [111 Market Place, Suite 1050, Baltimore, MD 21202, (410) 347-7700].

Educational Objectives of the BS in Computer Science

Graduates will:

1. Have a broad knowledge of computer science necessary to create computer solutions to real problems.

2. Be prepared for a technical position in high-tech industry and/or be prepared for graduate study.

3. Have the ability to write technical documents such as specifications, user manuals or technical papers.

4. Have the ability to make effective technical oral presentations.

5. Be cognizant of ethical, legal and social issues of computing.

Degree Requirements

1. **Hours Required and General/College Requirements:** A minimum of 130 semester hours, of which 45 must be advanced, and fulfillment of degree requirements for the Bachelor's degree as specified in the "General University Requirements" in the Academics section of this catalog and the College of Engineering requirements.

2. **Major Requirements:** A minimum of 45 semester hours, including CSCE 1030, 1040, 2050, 2610, 3110, 3600, 4010 (2), 4110 and 4410; plus 18 hours of computer science (including 15–18 hours to reach 45 advanced hours required for the degree). A maximum of 6 hours of credit in CSCE 4890, 4910, 4915, 4930, 4940 or 4950 will count toward this degree.

3. **Other Required Courses:**

a. MATH 1710, Calculus I; MATH 1720, Calculus II; MATH 1780, Probability Models; and MATH 2770, Discrete Mathematical Structures; plus 3 semester hours selected from MATH 2700, Linear Algebra and Vector Geometry; MATH 3350, Introduction to Numerical Analysis; or MATH 3410, Differential Equations I.

b. EENG 2710, Digital Logic Design

c. 16 hours of laboratory science: PHYS 1710/1730; 2220/2240; one natural life science chosen from BIOL 1710/1730, 1720/1740, ARCH 2800, GEOG 1710, GEOL 1610; plus one additional course chosen from the above natural life sciences or from CHEM 1410/1430, 1420/1440, or PHYS 3010/3030.

d. 3 hours selected from ENGL 4180, 4190, 4250.

4. **Minor:** Optional.

5. **Electives:** See four-year plan.

6. **Other Requirements:** A grade point average of at least 2.75 is required for all advanced computer science courses.

BS with a Major in Computer Science

Following is one suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

	HOURS
FALL	
CSCE 1030, Computer Science I	4
ENGL 1310, College Writing I*	3
MATH 1710, Calculus I	4
PSCI 1040, American Government*	3
Humanities*	<u>3</u>
Total	17

	HOURS
SPRING	
CSCE 1040, Computer Science II	3
ENGL 2700, Technical Writing**	3
MATH 2770, Discrete Mathematical Structures	3
PSCI 1050, American Government*	3
Visual and Performing Arts*	<u>3</u>
Total	15

SOPHOMORE YEAR

	HOURS
FALL	
CSCE 2050, Computer Science III	3
ENGR 2060, Professional Presentations (may be used to satisfy Communication requirement**)	3
EENG 2710, Digital Logic Design	3
HIST 2610, United States History to 1865*	3
MATH 1720, Calculus II	<u>3</u>
Total	15

	HOURS
SPRING	
CSCE 2610, Computer Organization	3
CSCE 3110, Data Structures and Algorithms	3
HIST 2620, United States History Since 1865*	3
MATH 1780, Probability Models	3
Social and Behavioral Sciences*	3
Wellness*	<u>3</u>
Total	18

JUNIOR YEAR

	HOURS
FALL	
CSCE 3600, Principles of Systems Programming	3
MATH 2700, Linear Algebra and Vector Geometry, or MATH 3350, Introduction to Numerical Analysis, or MATH 3410, Differential Equations I	3
PHYS 1710, Mechanics	3
PHYS 1730, Laboratory in Mechanics	1
CSCE Option (advanced)	3
Elective (advanced)	<u>3</u>
Total	16

	HOURS
SPRING	
CSCE Option (advanced)	3
CSCE Option (advanced)	3
ENGL 4180, Advanced Technical Writing, or ENGL 4190, Technical Editing, or ENGL 4250, Writing Technical Procedures and Manuals	3
PHYS 2220, Electricity and Magnetism	3
PHYS 2240, Laboratory in Wave Motion Electricity, Magnetism and Optics	1
Cross-Cultural, Diversity and Global Studies*	<u>3</u>
Total	16

SENIOR YEAR

	HOURS
FALL	
CSCE 4110, Algorithms	3
CSCE 4410, Software Development I	3
CSCE Option (advanced)	3
Elective (advanced)	3
Natural/Life Sciences (see degree requirements)	<u>4</u>
Total	16

	HOURS
SPRING	
CSCE 4010, Engineering Ethics	2
CSCE Option (advanced)	3
CSCE Option (advanced)	3
Elective (advanced)	3
Elective (advanced)	2
Natural/Life Sciences or Physical Sciences (see degree requirements)	<u>4</u>
Total	17

**See the University Core Curriculum section of this catalog for approved list of course options.*

*** See College of Engineering degree requirements section of this catalog for approved list of course options.*

Actual degree plans may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

Bachelor of Science with a Major in Computer Engineering

The Bachelor of Science degree with a major in computer engineering is designed for students who wish to specialize in computer hardware, communication systems, digital signal processing, micro-controllers, real-time and embedded systems. Computer engineering students are exposed to both theoretical and practical issues of both hardware and software in laboratories with state-of-the art equipment. The program provides a strong engineering background, with an understanding of the principles and techniques of computing. A professional degree, which includes a two-term/semester senior design project sequence, the BS is designed to meet the criteria of the Engineering Accreditation Commission

(EAC) of the Accreditation Board for Engineering and Technology (ABET). The degree program prepares the graduates for a career and graduate studies in computer engineering and related fields.

Educational Objectives of the BS in Computer Engineering

Graduates will:

1. Be able to design; evaluate material, computational and personnel resources to solve problems; work in multi-disciplinary teams; and communicate effectively.
2. Pursue graduate studies or challenging careers involving VLSI design, real-time systems, communications and networks or computer systems.
3. Exhibit an awareness of professional responsibility, ethics and the need to engage in lifelong learning.
4. Demonstrate a strong background in the breadth of computer engineering as evidenced by a good balance between software and hardware systems, including software development, design of digital systems, microprocessors, embedded systems, real-time systems and digital communication systems.

Degree Requirements

1. **Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 45 must be advanced, and fulfillment of degree requirements for the Bachelor's degree as specified in the "General University Requirements" in the Academic section of this catalog and the College of Engineering requirements.
2. **Major Requirements:** A minimum of 61 semester hours, including CSCE 1030, 1040, 2050, 2610, 3010, 3020, 3600, 3610, 3730, 4910, 4915; EENG 2610, 2710, 3510; two required Computer Engineering Specialty Area core courses from one of four specializations: Real-Time and Embedded Systems, VLSI and Electronics, Communication and Networks, and Computer Systems; one elective from the same specialization; and any two advanced-level technical electives (with approval of adviser).
3. **Other Required Courses:**
 - a. MATH 1710, Calculus I; 1720, Calculus II; MATH 1780, Probability Models; MATH 2700, Linear Algebra and Vector Geometry; MATH 2730, Multivariable Calculus; MATH 2770, Discrete Mathematical Structures.
 - b. PHYS 1710/1730; 2220/2240; CHEM 1410/1430.
 - c. Mathematics or Science Elective (3 hours, advanced, with adviser approval).
4. **Minor:** Optional.
5. **Electives:** See four-year plan.
6. **Other Requirements:** A grade point average of at least 2.75 is required for all advanced computer engineering courses.

BS with a Major in Computer Engineering

Following is one suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

FALL	HOURS
CHEM 1410, General Chemistry for Science Majors	3
CHEM 1430, General Chemistry Laboratory	1
CSCE 1030, Computer Science I	4
ENGL 1310, College Writing I, or ENGL 1313, Computer Assisted College Writing I*	3
HIST 2610, United States History to 1865*	3
MATH 1710, Calculus I	4
Total	18

SPRING	HOURS
CSCE 1040, Computer Science II	3
ENGL 2700, Technical Writing**	3
HIST 2620, United States History Since 1865*	3
MATH 1720, Calculus II	3
PHYS 2220, Electricity and Magnetism	3
PHYS 2240, Laboratory in Wave Motion, Electricity, Magnetism and Optics	1
Total	16

SOPHOMORE YEAR

FALL	HOURS
CSCE 2050, Computer Science III	3
ENGR 2060, Professional Presentations (may be used to satisfy Communication requirement**)	3
EENG 2610, Circuit Analysis	3
EENG 2710, Digital Logic Design	3
MATH 2700, Linear Algebra and Vector Geometry	3
Total	15

SPRING	HOURS
CSCE 2610, Computer Organization	3
MATH 1780, Probability Models	3
MATH 2730, Multivariable Calculus	3
MATH 2770, Discrete Mathematical Structures	3
PHYS 1710, Mechanics	3
PHYS 1730, Laboratory in Mechanics	1
Total	16

JUNIOR YEAR

FALL	HOURS
CSCE 3010, Signals and Systems	3
CSCE 3600, Principles of Systems Programming	3
CSCE 3610, Machine Structures	3
PSCI 1040, American Government*	3
Technical Elective (advanced)	3
Social and Behavioral Sciences*	3
Total	18

SPRING	HOURS
CSCE 3020, Fundamentals of Communication Theory	3
CSCE 3730, Reconfigurable Logic	3
EENG 3510, Electronics I (Devices and Materials)	3
PSCI 1050, American Government*	3
CSCE Specialty Area (advanced)	<u>3</u>
Total	15
SENIOR YEAR	
FALL	HOURS
CSCE 4910, Computer Engineering Design I	3
CSCE Specialty Area (advanced)	3
Mathematics or Science Elective (advanced)	3
Visual and Performing Arts*	3
Wellness*	<u>3</u>
Total	15
SPRING	HOURS
CSCE 4915, Computer Engineering Design II	3
CSCE Specialty Area Elective (advanced)	3
Cross-Cultural, Diversity and Global Studies*	3
Humanities*	3
Technical Elective (advanced)	<u>3</u>
Total	15

*See the University Core Curriculum section of this catalog for approved list of course options.

** See College of Engineering degree requirements section of this catalog for approved list of course options.

Actual degree plans may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

Minor in Computer Science

A minor in computer science consists of a minimum of 18 semester hours of computer science courses, including 6 advanced hours. Required courses are CSCE 1030, 1040 and 2050. Six hours of advanced courses must be taken at UNT.

Graduate Degrees

The Department of Computer Science and Engineering offers degree programs leading to the Master of Science and Doctor of Philosophy. Graduate minors in computer science may be selected at introductory and advanced levels. For information, consult the *Graduate Catalog*.

Courses of Instruction

All Courses of Instruction are located in one section at the back of this catalog.

Course and Subject Guide

The "Course and Subject Guide," found in the Courses of Instruction section of this book, serves as a table of contents and provides quick access to subject areas and prefixes.

Department of Electrical Engineering

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Murali Varanasi, Chair

Faculty

Professors Garcia, Varanasi. *Assistant Professors* Deng, Fu, Guturu, Li.

Introduction

The Department of Electrical Engineering at the University of North Texas provides an innovative program in electrical engineering, combining cognitive skills, industry-university joint projects and business skills with courses that form the foundation of electrical engineering discipline. Combining theory and practice, the curriculum is designed to serve the citizens and industries in Texas, particularly the North Texas region, and the nation.

The department is housed in a brand new facility designed to promote intellectual and scholarly endeavors of faculty and students. The department currently offers a Bachelor of Science degree and plans to offer a Master of Science degree beginning in 2007. There are currently six faculty members, and the department is actively recruiting several additional outstanding faculty. Research interests of the faculty include digital signal processing, radar and image processing, pattern recognition and wireless sensor networks.

The department received support from the National Science Foundation to offer an "Innovative Design- and Project-Oriented Electrical Engineering Program" under the Department-Level Reform initiative.

Mission

The mission of the Department of Electrical Engineering conforms to the mission of the College of Engineering through commitment to innovation and excellence in teaching, research and service. In