Department of Computer Science and Engineering

BS in Computer Science
BS in Computer Engineering

- Advising Information
- Core Curriculum
- Course Descriptions
- Degree Plan Information

UNT Discovery Park (NTDP) F201
(940) 565-2767
www.cse.unt.edu

Valid only for those on Catalog Year 2016-17

ADVISING INFORMATION:
http://www.cse.unt.edu/site/node/418

University of North Texas
Educational Objectives

Educational Objectives for the B.S. in Computer Science

Graduates will:
• Pursue graduate studies in computer science or related disciplines, and/or a career in a technology field utilizing skills from the computer science areas studied during the undergraduate program.
• Act responsibly and ethically in their professional conduct and successfully engage in life-long learning.
• Work effectively in multi-disciplinary teams and exhibit the ability to communicate effectively.
• Complete professional work assignments that exhibit the ability to design, develop and implement software while applying computer science principles and practices to the solution of real problems.

Educational Objectives for the B.S. in Computer Engineering

Graduates will:
• Have completed projects involving design, evaluation of materials, and management of computational and personnel resources to solve problems in multi-disciplinary teams and exhibit the ability to communicate effectively.
• Pursue graduate studies in computer engineering or related disciplines and careers involving VLSI design, real-time systems, communications, and networks or computer systems.
• Act responsibly and ethically in their professional conduct and successfully engage in life-long learning.
• Complete professional work assignments that exhibit 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.
COMPUTER SCIENCE
Bachelor of Science (B.S.) degree with a major in Computer Science

Department of Computer Science & Engineering
Discovery Park F-201; (940) 565-2767
Faculty Advisors: Dr. Ryan Garlick, Mr. David Keathly
ryan.garlick@unt.edu, david.keathly@unt.edu

Engineering Advising Office
Discovery Park A-101; (940) 565-4201
Academic Advisor: Heather Burrow
heather.burrow@unt.edu

UNIVERSITY CORE

COMMUNICATION
☐ 3 Hours approved course
Grade of "C" or better is required.

AMERICAN HISTORY
☐ HIST 2610, U.S. History To 1865 (3 Hours)
☐ HIST 2620, U.S. History From 1865 (3 Hours)

GOVERNMENT/POLITICAL SCIENCE
☐ PSCI 1040, Government: Laws & Institutions (3 Hours)
☐ PSCI 1050, Government: Processes & Policies (3 Hours)

If you are transferring credit for either PSCI course, check with your advisor about the application of courses.

CREATIVE ARTS
☐ 3 Hours approved course

LANGUAGE, PHILOSOPHY, & CULTURE
☐ 3 Hours approved course

SOCIAL & BEHAVIORAL SCIENCE
☐ 3 Hours approved course

DISCOVERY
☐ 3 Hours approved course

MAJOR REQUIREMENTS
Grades of C or better.

SCIENCE (Continued)
☐ 2 Lab sciences [8 Hours] chosen from:
  CHEM 1410, General Chemistry I (3 Hours) &
  CHEM 1430, General Chemistry I Lab (1 Hour)
  CHEM 1415, Chemistry for Engineers (3 Hours) &
  CHEM 1435, Chemistry for Engineers Lab (1 Hour)
  CHEM 1420, General Chemistry II (3 Hours) &
  CHEM 1440, General Chemistry II Lab (1 Hour)
  BIOL 1710, Biology I (3 Hours)
  BIOL 1760, Biology Lab (2 Hours)
  BIOL 1720, Biology II (3 Hours)
  BIOL 1760, Biology Lab (2 Hours)

ELECTRICAL ENGINEERING
☐ EENG 2710, Digital Logic Design (3 Hours)

COMPUTER SCIENCE and ENGINEERING
☐ CSCE 1030, Computer Science I (4 Hours)
☐ CSCE 1040, Computer Science II (3 Hours)
☐ CSCE 2100, Computing Foundations I (3 Hours)
☐ CSCE 2110, Computing Foundations II (3 Hours)
☐ CSCE 2610, Assembly Lang. & Computer Organization (3 Hours)
☐ CSCE 3110, Data Structures (3 Hours)
☐ CSCE 3600, Principles of Systems Programming (3 Hours)
☐ CSCE 4010, Social Issues in Computing (3 Hours)
☐ CSCE 4110, Algorithms (3 Hours)
☐ CSCE 4444, Software Engineering (3 Hours)
☐ CSCE 4901, Computer Science Capstone (3 Hours) or
  CSCE 4999, Senior Thesis (3 Hours)

COMPUTER SCIENCE and ENGINEERING CORE ELECTIVES
☐ 1 CSCE Core course [3 Hours] chosen from list options below
☐ 1 CSCE Core course [3 Hours] chosen from list options below

  CSCE 4115, Formal Lang., Automata & Computability (3 Hours)
  CSCE 4430, Programming Languages (3 Hours)
  CSCE 4600, Introduction to Operating Systems (3 Hours)
  CSCE 4610, Computer Architecture (3 Hours)
  CSCE 4650, Introduction to Compilation Techniques (3 Hours)

COMPUTER SCIENCE and ENGINEERING BREADTH ELECTIVES
☐ 1 CSCE Core course [3 Hours] chosen from list options below
☐ 1 CSCE Core course [3 Hours] chosen from list options below

  CSCE 3530, Introduction to Computer Networks (3 Hours)
  CSCE 4210, Game Programming I (3 Hours)
  CSCE 4220, Introduction to Computer Graphics (3 Hours)
  CSCE 4310, Introduction to Artificial Intelligence (3 Hours)
  CSCE 4350, Intro. to Database Systems Design (3 Hours)

COMPUTER SCIENCE and ENGINEERING FREE ELECTIVES
☐ CSCE 3** or 4*** (3 Hours) course not already applied above
☐ CSCE 3** or 4*** (3 Hours) course not already applied above
☐ CSCE 3** or 4*** (3 Hours) course not already applied above

Maximum of 6 hours may be taken from CSCE 4890, 4920, 4940, or 4950.

This is an unofficial simplified checklist effective Fall 2016. Degree requirements may change. You may need elective courses to help reach a minimum of 120 Total Hours & 42 Advanced Hours. Check with an advisor.
Prerequisite Structure
BS in Computer Science

CSCE 4920
Co-op

See Undergraduate catalog for requirements

CSCE 2900
Special Problems

Elective credit only

CSCE 1010
Intro to CS

Not for CSCE major credit

CSCE Core
Choose 6 hours from these courses
Pre-req’s vary

CSCE 4115
Formal Languages

CSCE 4430
Programming Languages

CSCE 4600
Intro to Operating Sys

CSCE 4650
Intro Compil. Techniques

CSCE 4610
Computer Architecture

CSCE Electives
Choose 9 hours
Pre-req’s vary

Any CSCE Upper Division (3*** or 4***) Courses not required in another area.

CSCE 4901
Capstone (if non-thesis)

CSCE 4910
Algorithm Analysis

CSCE 4920
Systems Programming

CSCE 4940
Database Systems

CSCE 4950
Computer Graphics

CSCE Breadth
Choose 6 hours from these courses
Pre-req’s vary

CSCE 3530
Intro to Networks

EENG 2710
Digital Logic

CSCE 3110
Data Structures

Must be an Engineering major

CSCE 2110
Computing Foundations 2

CSCE 2100
Computing Foundations 1

CSCE 2100
Computing Foundations 1

CSCE 2100
Computing Foundations 1

CSCE 1040
CS II

CSCE 2610
Computer Organization

Can be taken concurrently

Can be taken concurrently

MATH 1650
Pre-Calculus
UNT Level 2

MATH 1710
Calculus I
UNT Level 3

MATH 1710
Calculus I
UNT Level 3

PHYS 1710 / 1730

PHYS 2220 / 2240

Math 2700
Linear Algebra

Math 1720
Calculus II

Math 1780
Probability Models

BIOL 1710 or 1720 and Lab

CHEM 1410 or 1415 and Lab

MATH 1100
College Algebra
UNT Level 1

MATH 1010
Fund. of Algebra

MATH 1581
Survey Of Math

MATH 1681
Elem. Prob & Stats

CSCE Core
Choose 6 hours from these courses
Pre-req’s vary

CSCE 4115
Formal Languages

CSCE 4430
Programming Languages

CSCE 4600
Intro to Operating Sys

CSCE 4650
Intro Compil. Techniques

CSCE 4610
Computer Architecture

CSCE Electives
Choose 9 hours
Pre-req’s vary

Any CSCE Upper Division (3*** or 4***) Courses not required in another area.

CSCE 4901
Capstone (if non-thesis)

CSCE 4910
Algorithm Analysis

CSCE 4920
Systems Programming

CSCE 4940
Database Systems

CSCE 4950
Computer Graphics

CSCE Breadth
Choose 6 hours from these courses
Pre-req’s vary

CSCE 3530
Intro to Networks

EENG 2710
Digital Logic

CSCE 3110
Data Structures

Must be an Engineering major

CSCE 2110
Computing Foundations 2

CSCE 2100
Computing Foundations 1

CSCE 2100
Computing Foundations 1

CSCE 1040
CS II

CSCE 2610
Computer Organization

Can be taken concurrently

Can be taken concurrently

MATH 1650
Pre-Calculus
UNT Level 2

MATH 1710
Calculus I
UNT Level 3

MATH 1710
Calculus I
UNT Level 3

PHYS 1710 / 1730

PHYS 2220 / 2240

Math 2700
Linear Algebra

Math 1720
Calculus II

Math 1780
Probability Models

BIOL 1710 or 1720 and Lab

CHEM 1410 or 1415 and Lab

MATH 1100
College Algebra
UNT Level 1

MATH 1010
Fund. of Algebra

MATH 1581
Survey Of Math

MATH 1681
Elem. Prob & Stats

Required for BS

See math department for placement before registering for your first math course
# Suggested 4 Year Schedule

**BS in Computer Science**

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<th>Semester</th>
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COMPUTER ENGINEERING
Bachelor of Science (B.S.) degree with a major in Computer Engineering

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Academic Advisor: Heather Burrow
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COMMUNICATION
☐ 3 Hours approved course
Grade of “C” or better is required.

AMERICAN HISTORY
☐ HIST 2610, U.S. History To 1865 (3 Hours)
☐ HIST 2620, U.S. History From 1865 (3 Hours)

GOVERNMENT/POLITICAL SCIENCE
☐ PSCI 1040, Government: Laws & Institutions (3 Hours)
☐ PSCI 1050, Government: Processes & Policies (3 Hours)

If you are transferring credit for either PSCI course, check with your advisor about the application of courses.

CREATIVE ARTS
☐ 3 Hours approved course

LANGUAGE, PHILOSOPHY, & CULTURE
☐ 3 Hours approved course

SOCIAL & BEHAVIORAL SCIENCE
☐ 3 Hours approved course

DISCOVERY
☐ 3 Hours approved course

Major Requirements
Grades of C or better.

TECHNICAL COMMUNICATION
☐ TECM 2700, Technical Writing (3 Hours)

MATHEMATICS
☐ MATH 1710, Calculus I (4 Hours)
☐ MATH 1720, Calculus II (3 Hours)
☐ MATH 1780, Probability Models (3 hours)
☐ MATH 2700, Linear Algebra & Vector Geometry (3 Hours)
☐ MATH 2730, Multivariable Calculus (3 Hours)

SCIENCE
☐ PHYS 1710, Mechanics (3 Hours)
☐ PHYS 1720, Mechanics Lab (1 Hour)
☐ PHYS 2220, Electricity & Magnetism (3 Hours)
☐ PHYS 2240, Electricity & Magnetism Lab (1 Hour)
☐ CHEM 1410, General Chemistry I (3 Hours)
☐ CHEM 1430, General Chemistry I Lab (1 Hour)
☐ CHEM 1415, Chemistry for Engineers (3 Hours)
☐ CHEM 1435, Chemistry for Engineers Lab (1 Hour)

ADVANCED MATHEMATICS OR SCIENCE ELECTIVE
☐ 1 advanced Math or Science elective course (3 Hours) chosen from MATH 3***, MATH 4***, PHYS 3***, CHEM 3***, BIOL 3***, BIOL 4***, GEOG 3***, or GEOG 4***. Check with your advisor for approved options.

ELECTRICAL ENGINEERING
☐ ENGR 2405, Circuit Analysis (3 Hours) &
☐ ENGR 2415, Circuit Analysis Lab (1 Hour)
☐ ENGR 2720, Digital Logic Design (3 Hours) &
☐ ENGR 2730, Digital Logic Lab (1 Hour)
☐ EENG 3510, Electronics I (3 Hours)

COMPUTER SCIENCE and ENGINEERING
☐ CSCE 1020, Computer Science I (4 Hours)
☐ CSCE 1040, Computer Science II (3 Hours)
☐ CSCE 2100, Computing Foundations I (3 Hours)
☐ CSCE 2110, Computing Foundations II (3 Hours)
☐ CSCE 2610, Assembly Lang. & Computer Organization (3 Hours)
☐ CSCE 3010, Signals & Systems (3 Hours)
☐ CSCE 3020, Communications Systems (3 Hours)
☐ CSCE 3600, Principles of Systems Programming (3 Hours)
☐ CSCE 3612, Embedded Systems Design (3 Hours)
☐ CSCE 3730, Reconfigurable Logic (3 Hours)
☐ CSCE 4011, Engineering Ethics (3 Hours)
☐ CSCE 4910, Senior Design I (3 Hours)
☐ CSCE 4915, Senior Design II (3 Hours)

SPECIALTY AREA
Choose a specialty area & complete 3 courses from the approved options below:
☐ Specialty Elective (3 Hours)
☐ Specialty Elective (3 Hours)
☐ Specialty Elective (3 Hours)

Real-time & Embedded Systems Specialty Area (Choose 3 courses):
ELET 3750, CSCE 4440, 4444, 4600, 4610, 4620, 4730, 4890

VLSI & Electronics Specialty Area: (Choose 3 courses)
ELET 3750, 4300, 4340, PHYS 4500, CSCE 4610, 4730, 4890

Communications & Networks Specialty Area (Choose 3 courses): 
CSCE 3420, 3530, 4510, 4520, 4530, 4550, 4580

Computer Systems Specialty Area (Choose 3 courses):
CSCE 3030, 4050, 4240, 4600, 4610, 4620, 4650, 4730, 4890

Maximum of 6 hours may be taken from CSCE 4890, 4920, 4940, or 4950.

This is an unofficial simplified checklist effective Fall 2016. Degree requirements may change. You may need elective courses to help reach a minimum of 121 Total Hours & 42 Advanced Hours. Check with an advisor.
Computer Engineering Specialty Area Electives

**Specialization Area: Real-time and Embedded Systems (choose 3 courses)**

ELET 3750 – Embedded C Programming
CSCE 4440 – Real-Time Software Development
CSCE 4444 – Software Engineering
CSCE 4600 – Introduction to Operating Systems
CSCE 4610 – Computer Architecture
CSCE 4620 – Real-Time Operating Systems
CSCE 4730 – VLSI Design
CSCE 4890 – Directed Study in a Real-Time / Embedded Topic

**Specialization Area: VLSI and Electronics (choose 3 courses)**

ELET 3750 – Embedded C Programming
ELET 4340 – Digital Logic Design Techniques
ELET 4300 – Embedded System Organization
PHYS 4500 – Introduction to Solid State Physics
CSCE 4610 – Computer Architecture
CSCE 4730 – VLSI Design
CSCE 4890 – Directed Study in a VLSI / Electronics Topic

**Specialization Area: Communications and Networks (choose 3 courses)**

CSCE 3420 – Internet Programming
CSCE 3530 – Introduction to Computer Networks
CSCE 4510 – Introduction to Wireless Communication
CSCE 4520 – Wireless Networks and Protocols
CSCE 4530 – Computer Network Design
CSCE 4550 – Introduction to Computer Security
CSCE 4560 – Secure Electronic Commerce
CSCE 4890 – Directed Study in a Communications / Networks Topic

**Specialization Area: Computer Systems (choose 3 courses)**

CSCE 3030 – Parallel Programming
CSCE 4050 – Cryptography
CSCE 4240 – Introduction to Digital Image Processing
CSCE 4600 – Introduction to Operating Systems
CSCE 4610 – Computer Architecture
CSCE 4620 – Real-Time Operating Systems
CSCE 4650 – Introduction to Compilation Techniques
CSCE 4730 – VLSI Design
CSCE 4890 – Directed Study in a Systems topic
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### COMMUNICATION (3 Hours)
- ENGL 1310, College Writing I
- ENGL 1311, Honors College Writing I
- ENGL 1315, Writing about Literature I
- TECM 1312, Intro. to Writing For International Students
- TECM 1700, Intro. to Professional, Science, & Tech. Writing

AP English Language & Composition score of 4 or 5 fulfills this category

### AMERICAN HISTORY (6 Hours)
- HIST 2610, US to 1865 or
- HIST 2675, Honors US History to 1865
- HIST 2620, US from 1865 or
- HIST 2685, Honors US History from 1865

AP U.S. History score of 3, 4 or 5
CLEP History of United States I
CLEP History of United Stated II fulfills this category

### GOVT./POLITICAL SCIENCE (6 Hours)
- PSCI 1040, American Government or
- PSCI 1041, Honors Am. Government
- PSCI 1050, American Government or
- PSCI 1051, Honors Am. Government

AP U.S. Government & Politics score of 3, 4 or 5
CLEP American Government fulfills PSCI 1050 or PSCI 1051

### CREATIVE ARTS (3 Hours)
- ART 1300, Art Appreciation
- ART 1301, Honors Art Appreciation
- ART 2360, Art History Survey II
- COMM 2060, Performance of Literature
- DANC 1200, Appreciation of Dance
- DANC 2800, Survey of Dance
- MUMH 1600, Music in Human Imagination
- MUMH 2040, Music Appreciation
- MUMH 3000, Nineteenth-Century Music
- MUMH 3010, Twentieth-Century Music
- THEA 1340, Aesthetics of the Theatre
- THEA 2340, Theater Appreciation
- THEA 3030, World Theatre to 1700
- THEA 3040, World Theatre from 1700

AP Art History score of 4 or 5
IB Dance score of 4 or higher
fulfills this category

### LANGUAGE, PHIL. & CULTURE (3 Hours)
- ENGL 2210, World Literature I
- ENGL 2211, Honors World Literature I
- ENGL 2220, World Literature II
- ENGL 2221, Honors World Literature
- FREN 3040, Adv. Reading French Culture
- FREN 4060, Studies in French Literature
- FREN 4310, French Civilization & Culture
- GERM 3040, Topics in German Culture
- GERM 3050, Topics in German Literature
- GERM 4310, Topics Adv. German Culture
- HIST 1050, World History to 16th Century
- HIST 1060, World History from 16th Century
- ITAL 3040, Topics in Italian Culture
- ITAL 3050, Italian Culture Thru Film
- ITAL 3070, Intro. to Italian Literature
- JAPN 3020, Advanced Japanese I
- JAPN 3030, Advanced Japanese II
- MUNET 3030, Music Cultures of the World
- PHIL 1050, Introduction to Philosophy
- PHIL 1400, Contemporary Moral Issues
- PHIL 2050, Introduction to Logic
- PHIL 2070, Great Religions
- PHIL 2100, Intro. To Judaism
- PHIL 2310, Intro. To Ancient Philosophy
- PHIL 2400, Religion in American Society
- PHIL 2600, Ethics in Science

AP English Literature & Composition score of 4 or 5 fulfills this category
AP World History score of 3, 4 or 5
IB History score of 4 or higher
fulfills this category

### SOCIAL & BEHAVIORAL SCIENCE (3 Hours)
- AGER 4560, Minority Aging
- AGER 4800, Social Context of Aging
- ANTH 1010, Intro. to Anthropology
- ANTH 3200, Culture and Society
- BEHV 2300, Behavior Principles I
- CJUS 2100, Crime and Justice in the U.S.
- COMM 2020, Interpersonal Comm.
- DFRS 1013, Human Development
- EAPD 4050, Special Pop. in Disasters
- ECON 1100, Microeconomics
- ECON 1110, Macroeconomics
- GEOG 1200, Global Societies
- HLTH 2200, Family Life & Human Sexuality
- JOUR 1210, Mass Comm. & Society
- MDSE 2750, Consumers in Global Market
- MDSE 3370, Fashion Theory & Trend Analysis
- MKTG 2650, Princ. of Global Marketing
- PADM 2100, Diversity in Urban Gover.
- PSYC 1500, Mythbusters
- RHAB 3000, Microcounseling
- SOWK 1200, Race & Ethnic Relations
- SOWK 4540, Human Diversity
- SOWK 4970, Global Marketing

### DISCOVERY (3 Hours)
- AGER 2250, Aging in Film & Literature
- ANTH 1100, World Cultures
- ANTH 1150, World Cultures Through Film
- ANTH 2070, Intro. to Race & Ethnic Studies
- ANTH 2200, Gender Across Cultures
- BCIS 3615, Visual Display of Business Info.
- BIOL 1000, Discover Life Science
- BIOL 1750/1755, Intro. Research Lab I & II
- BMEN 1300, Discover Biomedical Engr.
- BUSI 1340, Managing Business Enterprise
- CHEM 1400, Discover Chemistry
- COMM 1010, Intro. to Communication
- COMM 1440, Honors Classical Argument
- COMM 2040, Public Speaking
- COMM 2140, Rhetoric & Argument
- COUN 2620, Diversity & Cultural Awareness
- DANC 1100, Stress Reduct. Thru Movement
- DFRS 2033, Parenting in Diverse Families
- DFRS 3423, Family, Schools, Communities
- EENG 1910, Learning to Learn
- ENGL 2500, Literary Analysis & Interpretation
- ENGR 1030, Technological Systems
- FREN 1610, French Influence in North Am.
- FREN 1620, French Language in Canada
- GEOG 1500, Geography of DFW Metroplex
- HMGT 1450, Principles of Nutrition
- HNRS 1100, The Good Society
- HNRS 1500, Intro. to Research
- INST 2100, Intro. to International Studies
- ITAL 1610, Italian Influences in the U.S.
- LANG 1610, World Ling. Landscapes
- LING 2050, Language of Now
- MATH 2000, Discrete Mathematics
- MDSE 2750, Consumers in a Global Market
- MEEN 1000, Discover Mech. & Energy Engr.
- MGMT 3330, Communicating in Business
- MKTG 3010, Professional Selling
- PHED 1000, Health Related Fitness
- PHIL 1800, Philosophy of Self
- PHIL 2400, Religion in American Society
- PHIL 2500, Contemp. Environmental Issues
- PSCI 1010, Politics and Pop Culture
- PSYC 1500, Mythbusters
- RHAB 3000, Microcounseling
- SOWK 2070, Race & Ethnic Relations
- SOWK 4540, Human Diversity
- TECM 1500, New Media for College Career
- WMST 2100, Women & Society

### CAPSTONE (3 Hours)
Fulfilled by a required course in your major

*Completion of IB program, earned IB Diploma, & minimum score of 4 or completion of IB program without the earned diploma & minimum score of 5, 6 or 7.
The tables below indicate the University Core, College of Engineering and Departmental course requirements that are available to take at area community colleges before transferring to UNT Denton or UNT Dallas. Courses that are taken at area community colleges after transferring to UNT Denton or UNT Dallas must be approved from a UNT advisor and may be different than what is listed on these tables.

### Core Classes

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<tr>
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Please see the College of Engineering Advisers in Discovery Park BEFORE enrolling in courses at another institution.
College of Engineering Core
Grades of ‘D’ are not accepted

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