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 2017-18

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. Mark Thompson
mark.thompson@unt.edu

Engineering Advising Office
Discovery Park A-101; (940) 565-4201
Academic Advisors: Heather Burrow, Beverly Wilks
heather.burrow@unt.edu, beverly.wilks@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 2305, U.S Political Behavior & Policy (3 Hours)
- PSCI 2306, U.S. & Texas Constitution & Institution (3 Hours)

CREATIVE ARTS
- 3 Hours approved course

LANGUAGE, PHILOSOPHY, & CULTURE
- 3 Hours approved course

SOCIAL & BEHAVIORAL SCIENCE
- 3 Hours approved course

COMPONENT AREA
- 3 Hours approved course

Major Requirements
Grades of C or better.

TECHNICAL COMMUNICATION
- TECM 2700, Technical Writing (3 Hours)
- 1 advanced TECM course chosen from:
  TECM 4100, Writing Grants & Proposals (3 Hours)
  TECM 4180, Advanced Technical Writing (3 Hours)
  TECM 4190, Technical Editing (3 Hours)
  TECM 4200, Research Methods (3 Hours)
  TECM 4250, Writing Procedures & Manuals (3 Hours)
  TECM 4300, Usability & User Experience (3 Hours)
  TECM 4700, Writing in the Sciences (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)

SCIENCES
- PHYS 1710, Mechanics (3 Hours) &
  PHYS 1730, Mechanics Lab (1 Hour)
- PHYS 2220, Electricity & Magnetism (3 Hours) &
  PHYS 2240 Electricity & Magnetism Lab (1 Hour)

SCIENTIFIC COMMUNICATION
- CHEM 1410, General Chemistry I (3 Hours) &
  CHEM 1430, General Chemistry I Lab (1 Hour) or
  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)

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

- Maximum of 6 hours may taken from CSCE 4890, 4920, 4930, 4940, 4950.

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

This is an unofficial simplified checklist effective Fall 2017. 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.
### COMPUTER SCIENCE

Sample Four-Year Schedule

Required prerequisite(s) indicated in parentheses & notes

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**FRESHMAN YEAR**

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<td>MATH 1710, Calculus I (see note 1)</td>
<td>MATH 1720, Calculus II (MATH 1710)</td>
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<td>CHEM 1410 or 1415, Chemistry (see note 2)</td>
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<td>BiOL 1710, Biology I (see note 2)</td>
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**SOPHOMORE YEAR**

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<td>MATH 2700, Linear Algebra (MATH 1720)</td>
<td>MATH 1780, Probability Models (MATH 1710)</td>
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<td>PHYS 2220, E. &amp; M. (MATH 1720, PHYS 1710, 1730)</td>
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<td>PHYS 1730, Mechanics Lab (MATH 1710)</td>
<td>PHYS 2240, E. &amp; M. Lab (MATH 1720, PHYS 1710, 1730)</td>
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<td>CSCE 2100, Computing Foundations I (CSCE 1040)</td>
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<td>EENG 2710, Digital Logic Design</td>
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**JUNIOR YEAR**

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**SENIOR YEAR**

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**Notes:**

1. MATH 1710 requires one of the following as prerequisite: completion of MATH 1650 with a grade of “C” or higher; or completion of MATH 1610 with a grade of “C” or higher; or Freshman Math Group Level 3; or approval authorized by score via mathematics testing; or earned credit for a math course at or above the MATH 1710 level.

2. BIOL 1710 & 1760 has no prerequisite. CHEM 1410 & 1430 requires MATH 1100, College Algebra (or higher) as prerequisite. CHEM 1415 & 1435 requires MATH 1650, Pre-Calculus (or higher) as prerequisite.

3. CSCE 1030 requires completion of or co-enrollment in MATH 1710, Calculus I (or higher) as prerequisite.

4. CHEM 1410 & 1430 requires MATH 1100, College Algebra (or higher) as prerequisite. CHEM 1415 & 1435 requires MATH 1650, Pre-Calculus (or higher) as prerequisite.

5. Must complete appropriate prerequisite(s) for each CSCE Core, Breadth and/or Free elective course.

6. CSCE 4901 requires TECM 2700 and CSCE 4444 as prerequisite as well as CSCE 4110 as corequisite or prerequisite. CSCE 4999 requires professor consent as prerequisite.

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Must earn at least a grade of “C” and a minimum 2.5 GPA in CSCE 1030, CSCE 1040, CSCE 2100, CSCE 2110, & MATH 1710 as foundations to enroll in advanced courses.

Must earn at least a grade of “C” in each course above except for most University Core courses.

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This is an unofficial sample schedule. Requirements, prerequisites, etc. may change. Students should meet with an advisor each semester for individual scheduling, program decisions, etc. Engineering admissions requirements must be met & a degree audit must be created in order to progress in the program to a timely graduation.
Prerequisite Structure
BS in Computer Science

CSCE 4290
CSCE 4920

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 3530
Computer Networks
CSCE 4430
Programming Languages
CSCE 4600
Intro to Operating Sys
CSCE 4650
Intro Compil. Techniques
CSCE 4115
Formal Languages

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 4999
Thesis (if thesis option)
requires Senior standing, topic submission, & instructor approval

Special Problems / Directed Study
See Undergraduate catalog for requirements

CSCE 4890
CSCE 4920
CSCE 4940
CSCE 4950

Maximum 6 hours credit in these courses

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

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

CSCE 4290
Nat. Lang. Processing
CSCE 4210
Game Programming
CSCE 4310
Intro to AI
CSCE 4350
Database Systems
CSCE 4460
Software Testing
CSCE 4240
Dig. Img. Processing
CSCE 4550
Computer Security

See math department for placement before registering for your first math course

Math 1010
Fund. of Algebra
Math 1581
Survey Of Math
Math 1681
Elem. Prob & Stats

Math 2700
Linear Algebra
Math 1720
Calculus II
Math 1780
Probability Models

Phys 2220 / 2240
Phys 1710 / 1730

Chem 1410 or 1415 and Lab

Biol 1710 or 1720 and Lab

Math 1100
College Algebra
UNT Level 1

Math 1040 CS II

Math 1030 CS I

May be taken concurrently

Math 1650
Pre-Calculus
UNT Level 2

Math 1710
Calculus I
UNT Level 3

CSCE 4110
Algorithm Analysis

CSCE 3110
Data Structures

CSCE 2110
Computing Foundations 2

CSCE 2100
Computing Foundations 1

CSCE 4290
Nat. Lang. Processing
CSCE 4210
Game Programming
CSCE 4310
Intro to AI
CSCE 4350
Database Systems
CSCE 4460
Software Testing

CSCE 4240
Dig. Img. Processing
CSCE 4550
Computer Security

CSCE 4901
Capstone (if non-thesis)

CSCE 4999
Thesis (if thesis option)
requires Senior standing, topic submission, & instructor approval

CSCE 4290
Nat. Lang. Processing
CSCE 4210
Game Programming
CSCE 4310
Intro to AI
CSCE 4350
Database Systems
CSCE 4460
Software Testing

CSCE 4240
Dig. Img. Processing
CSCE 4550
Computer Security

May be taken concurrently

Math 1100
College Algebra
UNT Level 1

Optional
Required for BS

See Undergraduate catalog for requirements

UN Level 0

Optional
Required for BS
Computer Engineering Specialty Area Electives

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

- ELET 3750 – Embedded C Programming
- CSCE 3610 – Introduction to Computer Architecture
- 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 3610 – Introduction to Computer Architecture
- 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 3610 – Introduction to Computer Architecture
- CSCE 4050 – Applications of 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
COMPUTER ENGINEERING
Bachelor of Science (B.S.) degree with a major in Computer Engineering

Department of Computer Science & Engineering
Discovery Park F-201; (940) 565-2767
Faculty Advisors: Dr. Robin Pottathuparambil
Robin.Pottathuparambil@unt.edu

Engineering Advising Office
Discovery Park A-101; (940) 565-4201
Academic Advisors: Ashley Hubbard, Errica Smith,
Ashley.Hubbard@unt.edu, Errica.smith@unt.edu

This is an unofficial simplified checklist effective Fall 2017. 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.

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 2305, U.S Political Behavior & Policy (3 Hours)
- PSCI 2306, U.S. & Texas Constitution & Institution (3 Hours)

CREATIVE ARTS
- 3 Hours approved course

LANGUAGE, PHILOSOPHY, & CULTURE
- 3 Hours approved course

SOCIAL & BEHAVIORAL SCIENCE
- 3 Hours approved course

COMPONENT AREA
- 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)

SCiences
- PHYS 1710, Mechanics (3 Hours) &
  PHYS 1730, 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)
  or
  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 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 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 3610, 4440, 4444, 4600, 4610, 4620, 4730, 4890

VLSI & Electronics Specialty Area: (Choose 3 courses)
- ELET 3750, 4300, 4340, CSCE 3610, 4610, 4730, 4890

Communications & Networks Specialty Area (Choose 3 courses):
- CSCE 3420, 3530, 4510, 4520, 4530, 4550, 4560, 4890

Computer Systems Specialty Area (Choose 3 courses):
- CSCE 3030, 3610, 4050, 4240, 4600, 4610, 4620, 4650, 4730, 4890

Maximum of 6 hours may taken from CSCE 4890, 4920, 4930, 4940, 4950.
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### SOPHOMORE YEAR

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<td>PHYS 2220, E. &amp; M. (MATH 1720, PHYS 1710, 1730)</td>
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### SENIOR YEAR

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<tr>
<td>CSCE 4910, Design I (CSCE 3612, EENG 3510)</td>
<td>CSCE 4915, Design II (CSCE 4910)</td>
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<tr>
<td>CSCE Specialty Area Elective course (see note 5)</td>
<td>CSCE 4011, Engineering Ethics (CSCE 3600)</td>
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<td>Total Hours</td>
<td>Advanced Level General Elective (see note 6)</td>
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### Notes:

- **Note 1:** MATH 1710 requires one of the following as prerequisite: completion of MATH 1650 with a grade of “C” or higher; or completion of MATH 1610 with a grade of “C” or higher; or Freshman Math Group Level 3; or approval authorized by score via mathematics testing; or earned credit for a math course at or above the MATH 1710 level.
- **Note 2:** CHEM 1410 & 1430 requires MATH 1100, College Algebra (or higher) as prerequisite. CHEM 1415 & 1435 requires MATH 1650, Pre-Calculus (or higher) as prerequisite.
- **Note 3:** CSCE 1030 requires completion of or co-enrollment in MATH 1710, Calculus I (or higher) as prerequisite.
- **Note 4:** EENG 2610 or ENGR 2405 & ENGR 2415 lab requires completion of MATH 1720 and either completion of or co-enrollment in PHYS 2220 & 2240 as prerequisite.
- **Note 5:** Must complete prerequisite(s) for each CSCE Specialty Area Elective course.
- **Note 6:** Advanced level general elective may be needed to reach 42 total advanced hours. Please check with an advisor.

Must earn at least a grade of “C” and a minimum 2.5 GPA in Communications Core, TECM 2700, MATH 1710, ENGR 2720/2730, CSCE 1030, CSCE 1040, CSCE 2100 as foundations to enroll in advanced courses.

Must earn at least a grade of “C” in each course above except for most University Core courses.

This is an unofficial sample schedule. Requirements, prerequisites, etc. may change. Students should meet with an advisor each semester for individual scheduling, program decisions, etc. Engineering admissions requirements must be met & a degree audit must be created in order to progress in the program to a timely graduation.
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>
<th>UNT Course</th>
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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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<th>UNT Course</th>
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