

COMPUTER SCIENCE



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BS, MS, McNeese State University; PhD (2002) Texas Tech University.

Administered by the Department of Mathematical and Computing Sciences within the College of Arts and Sciences.

The Bachelor of Science degree in Computer Science gives students the opportunity to obtain a thorough understanding of computers and their applications, and in the design and analysis of software and hardware systems for use in scientific and/or business environments.

Degree Requirements

The total credits required for a B.S. in Computer Science are **120**.

General Education

Students must complete the requirements shown in the General Education Requirements section of this catalog, pages 63-64. The courses in laboratory sciences (as part of the General Education Core) **must** form a two-course sequence.

Computer Use

All majors must demonstrate a basic use of JAVA through completion of COSC 1430 and COSC 2430.

Major Requirements

All beginning students are expected to take COSC 1430 and 2430 or the equivalent before starting the major courses. These courses introduce general computer concepts and applications and develop programming skills. To complete the major program language requirements, the student will be expected to demonstrate programming competence in a second general purpose high level language. This competency can be demonstrated through the successful completion of a course in an approved language.

All plans of study in Computer Science include a common core of courses:

COSC 3310	Digital Computer Organization
COSC 3312	Discrete Mathematics
COSC 3315	Information Systems Design
COSC 3420	Data Structures

In addition to the common core, the student majoring in Computer Science is required to complete five advanced Computer Science courses including 3-6 hours of COSC 4395. These courses will be determined in consultation with the Computer Science faculty. In support of the major courses, the student is required to complete the Calculus sequence through MATH 2415, MATH 3301, and at least one additional mathematics course selected from MATH 3305, 3310, 3315 and 3320. Students at U. T. Permian Basin majoring in Computer Science are required to have a minor. The choice of the minor is up to the student but should be selected to further the student's education objectives.

No more than 45 semester credit hours of Computer Science may be applied toward the 120 semester hour minimum required for a degree.

Additional requirements:

1. The courses in laboratory sciences (as a part of the General Education Core) **must** form a two semester sequence.
2. One additional English Literature course (2000 or 3000 level).
3. Two capstone courses: NTSC 4301 and NTSC 4311.

Computer Science as a minor

Students seeking a minor in computer science must complete the courses listed below, or equivalent courses as approved by a computer science advisor.

COSC 1430	Introduction to Computer Science I	4
COSC 2430	Introduction to Computer Science II	4
COSC 2420	C Programming, or another course in a high level Language approved by the advisor	3/4
COSC 3310	Digital Computer Organization	3
COSC 3315	Information Systems Design	3
COSC 3xxx or 4xxx		3/4
	TOTAL	20/22

Faculty in Computer Science may allow transferred credits to count towards a major or a minor in Computer Science. The number of credit hours required, at the upper-level or in total, can not be reduced except by academic petition.

Teacher Certification and TExES Requirements

Candidates for TExES tests in Computer Science must complete the courses listed below, or equivalent courses as approved by a computer science advisor.

COSC 1430	Introduction to Computer Science I	4
COSC 2430	Introduction to Computer Science II	4
COSC 2420	C Programming, or another course in a high level Language approved by the advisor	3/4
COSC 3310	Digital Computer Organization	3
COSC 3312	Discrete Mathematics	3
COSC 3315	Information Systems Design	3
COSC 3420	Data Structures	4
	TOTAL	24/25

Course Listing

COSC 1335 Computers and Problem Solving (3)

Introduction to basic issues related to computer aided problem solving. Computational problems will be studied using software packages, including spreadsheets and database systems. Use of the Internet and the World Wide Web, as problem solving resources is introduced. Basics of computer systems will be introduced. Same as Business Field of Study course COSC/BCIS 1305. Prerequisites: College Algebra or equivalent. FS

COSC 1389 Multi Listing Freshman Course (3)

Freshman courses which will be offered only once or will be offered infrequently or which are being developed before a regular listing in the catalog.

COSC 1430 Introduction to Computer Science I (4)

Computer organization, algorithm design, programming, and elementary data structures. Introduction to programming in a high-level language. Prerequisite or Corequisite: Math 1332 or 1324 or 2412 or equivalent. FS

COSC 2420 C Programming (4)

Programming in C, investigating the characteristics and implementation. Prerequisite: COSC 1430. S

COSC 2430 Introduction to Computer Science II (4)

Continuation of COSC 1430. Data structures, data abstraction, information hiding. Advanced programming in the language of the current COSC 1430. Prerequisite: COSC 1430. FS

COSC 3310 Digital Computer Organization (3)

Design of arithmetic, control, and memory units, binary data representation, error-detecting and error-correcting codes. Prerequisite: COSC 2430. F

COSC 3312 Discrete Mathematics (3)

Elementary logic, sets, functions, relations, permutations and combinations, modular arithmetic, graph theory and its applications. Prerequisite: MATH 2414. F

COSC 3315 Information Systems Design (3)

Computer systems and relationships between hardware and software components. Emphasis on business system design and analysis. Prerequisite: COSC 2430. S

COSC 3360 Computer Ethics (3)

An introduction to the responsibilities generally, and the ethical behavior specifically, expected of the computer and information systems professional. Includes the philosophical bases of ethical decision-making and the application of these principles to issues that arise in computing and information systems. Discussion of ethical standards as established by governmental bodies and professional organizations. Prerequisite: COSC 3315.

COSC 3420 Data Structures (4)

Design and implementation of algorithms for handling data structures such as linear lists, linked lists, stacks, queues, graphs, trees and strings. Prerequisites: COSC2430 and COSC3312. S

COSC 4330 Operating Systems (3)

Resource allocation including processors, main memory, I/O subsystems, and software resources. Prerequisites: COSC 3310, 3420.

COSC 4335 Distributed Information Systems (3)

Study of network-based information systems, including distributed database systems. Prerequisite: COSC 4415.

COSC 4350 Artificial Intelligence (3)

Foundations of AI, intelligent agent-based representation, problem solving and search algorithms, game playing. Introduction to machine learning algorithms. Prerequisites: COSC 3310, 3420, MATH 2415.

COSC 4370 Data Communications (3)

Theory and techniques related to signal transmission, transmission media, signal encoding, interfacing, data link control and protocols. Prerequisites: COSC 3310 and permission of the instructor.

COSC 4389 Multi Listing (3)

Undergraduate courses which will be offered only once or will be offered infrequently or which are being developed before a regular listing in the catalog and may be acceptable for graduate credit.

COSC 4390 Theory of Computation (3)

Turing machines, Church's thesis, recursive functions, computability, and computational complexity. Prerequisite: COSC 3312 or MATH 3315.

COSC 4391 Contract Study (3)

Advanced independent study or research (equivalent to senior level course). These courses will not count for graduate credit

COSC 4395 Research (1-3)

Research in a selected field of computer science. Prerequisite: consultation with the major advisor and permission of the research sponsor. May be repeated for credit. FS

COSC 4415 Database Systems (4)

Introduction to database design and implementation using the ER model. Relational model concepts, constraints and relational algebra. Normalization, optimization and concurrency. Prerequisite: COSC 3315

COSC 4425 Programming Algorithms (4)

Investigation of programming strategies, and the analysis of sequential and parallel algorithms to optimize them from memory and time constraints. Prerequisite: COSC 3420.

COSC 4455 Multimedia and Web Development (4)

Use of software development tools for construction of multimedia and Web pages, including an introduction to HTML and XML. Students will utilize industry standard tools for processing graphics, animation, audio, and video. Prerequisite: COSC 3315.

COSC 4460 Software Engineering (4)

Fundamental Concepts and General Principles for software systems development. Visual modeling, software development life cycles, CASE tools, Web-based information systems. Prerequisite: COSC 3315. F

COSC 4475 Distributed Systems (4)

An introduction to the concepts of distributed processing. Topics include distributed architectures, distributed operating systems and programming languages, and distributed algorithms. Prerequisite: COSC 3310, 3420

COSC 4480 Programming Languages (4)

Fundamental concepts and general principles underlying the structure of high level programming languages in current use. Prerequisites: COSC 3420, knowledge of two high level programming languages. COSC 3310 is recommended.

2007-2009 DEGREE PLAN: BS IN COMPUTER SCIENCE

GENERAL EDUCATION REQUIREMENTS:

- ___ English Composition, 1301 & 1302
- ___ Literature, ENGL 2322, 2323, 2327, or 2328
- ___ U.S. History, 1301 & 1302
- ___ U.S. and State Government, PLSC 2305 & 2306
- ___ Communication, COMM 1315, 1316, or 2310
- ___ Visual & Performing Arts
- ___ Social Science

NOTES ON GRADUATING:

1. Read the U. T. Permian Basin catalog and be familiar with the University's requirements for the BS degree. **It is the student's responsibility to read the catalog and be familiar with and fulfill all the requirements for the BS degree.**
2. Complete at least 120 sch for the BS degree.
3. At least 54 sch must be at the junior or senior level. At least 30 of these hours must be completed at U. T. Permian Basin.
4. Students majoring in Computer Science seeking secondary certification are not required to complete a minor, but must complete a minimum of 24 sch in their second teaching field.
5. Obtain at least a 2.0 average in all General Education and minor courses and at least a "C" in all courses for the Computer Science major. Maintain at least a grade point average of 2.0 or "C" in all courses applicable toward the BS degree.

MINOR: _____

A minor requires 18–24 sch of which 9 sch must be completed at the junior and/or senior level.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

DEPARTMENTAL REQUIREMENTS:

- ___ Literature at 2xxx, 3xxx, or 4xxx level
- ___ Science with lab: Biology, Chemistry, Geology, or Physics
- ___ Science with lab (companion to the above course)
- ___ NTSC 4301 Environmental Ethics
- ___ NTSC 4311 History and Philosophy of Science

MATHEMATICS SUPPORT:

- ___ MATH 2413 Calculus & Analytical Geometry I
- ___ MATH 2414 Calculus & Analytical Geometry II
- ___ MATH 2415 Calculus & Analytical Geometry III
- ___ MATH 3301 Statistics
- ___ MATH 3305, 3310, 3315, or 3320