# BACHELOR OF SCIENCE IN COMPUTER SCIENCE (CYBERSECURITY)

**Web Site:** https://twu.edu/computer-science/degree-programs/cybersecurity/

The Bachelor of Science in Computer Science at Texas Woman's University offers students the opportunity to build a strong foundation of skills and knowledge in a broad and rapidly changing technical field while also allowing them to focus their upper-level studies around topics in Computer Science such as Database Administration, Software Development, Web and Mobile Applications, Networking and Data Communications, Hardware and Robotics, Interface and Information Architecture, and other areas based on student interest and aptitude.
  The program seeks to engender student confidence, adaptability, and understanding of real-world and cross-professional applicability of technology for all, regardless of gender, race, ethnicity, or disability.
  Students enrolled in the program are offered the opportunity to participate in lively, collaborative, and ever-changing classroom activities and curriculum as facilitated by a diverse, knowledgeable, caring, and eager faculty.  Graduates of the program go on to obtain a variety of technology jobs.

## Marketable Skills

Defined by the Texas Higher Education Coordinating Board's 60x30 Strategic Plan (https://reportcenter.highered.texas.gov/agency-publication/miscellaneous/thecb-60x30-strategic-plan/) as, "Those skills valued by employers that can be applied in a variety of work settings, including interpersonal, cognitive, and applied skills areas. These skills can be either primary or complementary to a major and are acquired by students through education, including curricular, co-curricular, and extracurricular activities."

1. Work effectively as a member of a project team to coordinate database and project development, determine project scope and limitations, critically analyze issues, and solve problems.
2. Develop and implement procedures for data management, data storage and retrieval, evaluating data quality, data security, data transfer, data analysis, modeling, and visualization.
3. Plan, coordinate, and implement security measures to safeguard information in computer files against accidental or unauthorized damage, modification, or disclosure.
4. Design, create, and administer a computer network.
5. Create web-based applications to acquire, present, and deliver data to customers.
6. Demonstrate personal accountability and work habits, integrity, and ethical behavior.
7. Proficient in the software tools to achieve the skills listed, including but not limited to Java, Python, Perl, SQL, NoSQL, R, HTML, JavaScript, PHP, SAS, SPSS, and modeling software.

## Admissions

All applicants must meet the general undergraduate admission requirements (https://catalog.twu.edu/undergraduate/admission-information/).

## Degree Requirements

**Total Semester Credit Hours (SCH):** 120

**Major:** 44 SCH;  **Required Minor:** 18 SCH

**Program Code:** COMPSCI.BS.CYBER ;   **CIP Code:** 11.0101.00

### Texas Core Curriculum

| Code | Title | SCHs |
|------|-------|------|
| ENG 1013 | Composition I (10) | 3 |
| ENG 1023 | Composition II (10) | 3 |
| Mathematics (20) | | 3 |
| Life & Physical Sciences (30) | | 6 |
| Language, Philosophy, & Culture (40) | | 3 |
| Creative Arts (50) | | 3 |
| HIST 1013 | History of the United States, 1492-1865 (60) | 3 |
| HIST 1023 | History of the United States, 1865 to the Present (60) | 3 |
| POLS 2013 | U.S. National Government (70) | 3 |
| POLS 2023 | Texas Government (70) | 3 |
| Social & Behavioral Sciences (80) | | 3 |
| CAO: Multicultural-Women's Studies (90) | | 3 |
| CAO: First Year Seminar, Wellness or Mathematics (91) | | 3 |
| **Total SCHs** | | **42** |

### Courses Required for Major

| Code | Title | SCHs |
|------|-------|------|
| CSCI 1423 & CSCI 1421 | Programming Fundamentals I and Programming Fundamentals I - Laboratory | 4 |
| CSCI 2443 | Computer Organization and Machine Language | 3 |
| CSCI 2493 | Programming Fundamentals II | 3 |
| CSCI 3053 | Data Structures | 3 |
| CSCI 3413 | Software Engineering | 3 |
| CSCI 3423 | Database Management | 3 |
| CSCI 3443 & CSCI 3441 | Digital Logic and Computer Architecture and Digital Logic and Computer Architecture - Laboratory | 4 |
| CSCI 3503 | Operating Systems | 3 |
| CSCI 3613 | Algorithm Analysis and Design | 3 |
| CSCI 4313 | Networking and Data Communication | 3 |
| **Computer Science Electives** | | |
| Take 12 SCH from the following Essential and Applied Computing courses | | 12 |
| Essential options - Take a minimum of 2 of the following courses: | | |
| CSCI 3313 | App Development for Mobile Devices | |
| CSCI 3323 | Robotics Design and Development | |
| CSCI 3703 | Interface Design and Development | |
| CSCI 4623 or CSCI 4723 | Big Data and High Performance Computing Machine Learning | |
| CSCI 4803 | Programming for the Web | |
| CSCI 4823 | Principles of Data Mining | |
| Applied Options - Take a minimum of 1 of the following courses: | | |

| CSCI 3103 | Applied Computer Graphics | |
|---|---|---|
| CSCI 3353 | Interactive Digital Art | |
| CSCI 3603 | Foundations of Data Science | |
| CSCI 3803 | Website Development | |
| CSCI 4303 | Advanced Modeling and Visualization | |
| CSCI 4353 | Advanced Interactive Digital Art | |
| CSCI 4513 | Data Warehousing | |
| **Cybersecurity Emphasis** | | |
| CSCI 2513 | Information Security and Ethics | 3 |
| CSCI 3713 | Fundamentals of Cryptography | 3 |
| CSCI 4343 | Digital Forensics | 3 |
| CSCI 4463 | Ethical Hacking and Systems Defense | 3 |
| CSCI 4483 | Digital Trust and Privacy | 3 |
| CSCI 4623 | Big Data and High Performance Computing | 3 |
| or CSCI 4723 | Machine Learning | |
| **Total SCHs** | | **62** |

## Departmental Requirements

| Code | Title | SCHs |
|---|---|---|
| MATH 2014 | Calculus I | 4 |
| MATH 3013 | Discrete Mathematics | 3 |
| MATH 3073 | Matrix Methods | 3-4 |
| or MATH 2024 | Calculus II | |
| or MATH 4013 | Probability and Statistics | |
| Electives | | 6 |

All students must complete three semester credit hours in approved Global Perspectives courses (graduation requirement).

# Plan of Study

### First Year

| Fall | | TCCN | SCHs |
|---|---|---|---|
| CSCI 1423 & CSCI 1421 | Programming Fundamentals I and Programming Fundamentals I - Laboratory | | 4 |
| ENG 1013 | Composition I | ENGL 1301 | 3 |
| HIST 1013 | History of the United States, 1492-1865 | HIST 1301 | 3 |
| UNIV 1231 | Learning Frameworks: First-Year Seminar | EDUC 1100, EDUC 1200, EDUC 1300 | 1 |
| Mathematics Core (Math 1313 suggested) | | | 3 |
| Social & Behavioral Sciences Core | | | 3 |
| | SCHs | | 17 |

| Spring | | TCCN | |
|---|---|---|---|
| CSCI 2493 | Programming Fundamentals II | COSC 1437 | 3 |
| ENG 1023 | Composition II | ENGL 1302 | 3 |
| HIST 1023 | History of the United States, 1865 to the Present | HIST 1302 | 3 |
| MATH 2014 | Calculus I | MATH 2413 | 4 |
| Creative Arts Core | | | 3 |
| | SCHs | | 16 |

### Second Year

| Fall | | TCCN | |
|---|---|---|---|
| CSCI 3053 | Data Structures | | 3 |
| CSCI 3423 | Database Management | | 3 |
| POLS 2013 | U.S. National Government | GOVT 2305 | 3 |
| Life & Physical Sciences Core | | | 3 |
| Language, Philosophy, & Culture Core | | | 3 |
| | SCHs | | 15 |

| Spring | | TCCN | |
|---|---|---|---|
| CSCI 2443 | Computer Organization and Machine Language | COSC 2425 | 3 |
| CSCI 3503 | Operating Systems | | 3 |
| POLS 2023 | Texas Government | GOVT 2306 | 3 |
| CAO: Women's Studies (MATH 2053 recommended) | | | 3 |
| Life & Physical Sciences Core | | | 3 |
| | SCHs | | 15 |

### Third Year

| Fall | | TCCN | |
|---|---|---|---|
| CSCI 3413 | Software Engineering | | 3 |
| CSCI 3443 & CSCI 3441 | Digital Logic and Computer Architecture and Digital Logic and Computer Architecture - Laboratory | | 4 |
| CSCI 2513 | Information Security and Ethics | | 3 |
| Computer Science Electives | | | 6 |
| | SCHs | | 16 |

| Spring | | TCCN | |
|---|---|---|---|
| CSCI 3613 | Algorithm Analysis and Design | | 3 |
| CSCI 3713 | Fundamentals of Cryptography | | 3 |
| CSCI 4343 | Digital Forensics | | 3 |
| MATH 3013 | Discrete Mathematics | | 3 |
| Elective | | | 3 |
| | SCHs | | 15 |

### Fourth Year

| Fall | | TCCN | |
|---|---|---|---|
| CSCI 4313 | Networking and Data Communication | | 3 |
| CSCI 4483 | Digital Trust and Privacy | | 3 |
| Computer Science Elective | | | 3 |
| Elective | | | 3 |
| Elective | | | 2 |
| | SCHs | | 14 |

| Spring | | TCCN | |
|---|---|---|---|
| CSCI 4623 or 4723 | Big Data and High Performance Computing or Machine Learning | | 3 |
| CSCI 4463 | Ethical Hacking and Systems Defense | | 3 |
| MATH 3073, 2024 ,or 4013 | Matrix Methods or Calculus II or Probability and Statistics | MATH 2414 | 3 |

| Computer Science Elective | 3 |
| --- | --- |
| **SCHs** | **12** |
| **Total SCHs:** | **120** |