

## Computer Science

*Faculty:* Pulimood *Chair*; Knox, Li, Papamichail, Salgian, Tao,  
*Faculty from mathematics with joint teaching appointments in Computer Science:* Conjura

The computer science curriculum is designed to prepare students for employment as computer science professionals, as well as to provide a strong background for advanced study. The BS in Computer Science program is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>. All students take courses in problem solving and programming fundamentals, data structures, computer architecture, operating systems, algorithm analysis, software engineering, and programming languages or theory of computation. Upper-level options support an in-depth exploration of a range of subdisciplines including, but not limited to, artificial intelligence, database systems, graphics, networks, security, computational biology, and human computer interaction. Special topics courses offered each semester provide the opportunity to study and work with the latest trends in technology. For their capstone experiences students participate in research and/or industry experiences which culminate in professional presentations. Students enhance their studies with course work in mathematics and science, as well as in arts, humanities, history, and other disciplines in social sciences. A minimum of 32 course units is required for graduation.

The Department of Computer Science encourages its students to consider studying abroad for a semester as part of their curriculum. TCNJ students who study abroad, participate in global student teaching, pursue international internships, or go on exchange at colleges and universities in the U.S. can do so usually at a cost comparable to a semester spent at TCNJ. For more information about studying outside the United States without delaying graduation, academic advisors should be consulted. Further details are available from the College's [Center for Global Engagement](#).

### Requirements for the major:

#### I. Computer Science Courses 12.5 course units

##### Required Seminar Courses

CSC 099: Orientation to Computer Science	0 course unit
CSC 199: Computer Science Professional Development Seminar	0.25 course unit
CSC 299: Junior Seminar in Computer Science	0.25 course unit

##### Required Introductory Core Computer Science Courses

CSC 220/CS I: Computational Problem Solving*	1 course unit
CSC 230/CS II: Data Structures*	1 course unit
CSC 270/Discrete Structures	1 course unit

*\* A student who completed CSC 250 prior to transferring to the major and wishes to use this course to meet the CSC 220 and CSC 230 requirement must successfully complete an entrance test in C++. If the substitution is approved, the student must take an additional CS Option course to meet the Computer Science major requirements.*

##### Required Advanced Core Computer Science Courses

CSC 325/Computer Architecture	1 course unit
CSC 335/Analysis of Algorithms	1 course unit
CSC 345/Operating Systems	1 course unit
CSC 415/Software Engineering	1 course unit
CSC 435/Programming Languages	
<i>or</i>	1 course unit
CSC 445/Theory of Computation	

**Required Capstone Requirement**

CSC 399/Internship

*or*

CSC 498/Mentored Research I in Computer Science

1 course unit

**Computer Science Options**

Select three (or four\*) courses from the following list\*\*:

CSC 307/Data Mining and Predictive Modeling

CSC 315/Database Systems

CSC 320/Information Retrieval

CSC 350/Computer Graphics

CSC 360/Computer Networking

CSC 380/Artificial Intelligence

CSC 425/Compilers and Interpreters

CSC 435/Programming Languages

CSC 445/Theory of Computation

CSC 450/Computer and Network Security

CSC 470/Topics in Computer Science

CSC 471/Genomics and Bioinformatics

\* A student who completed CSC 250 prior to transferring to the major and wishes to use this course to meet the CSC 220 and CSC 230 requirement must successfully complete an entrance test in C++. If the substitution is approved, the student must take an additional CS Option course to meet the Computer Science major requirements.

\*\* The list of Computer Science Options courses offered may change depending on availability of faculty and current trends in the computer science.

One additional capstone course or independent study from the following list may be chosen, with advisement and departmental approval, and applied towards the Computer Science Options.

Capstone Courses and Independent Study

CSC 399/Internship in Computer Science

CSC 498/Mentored Research I in Computer Science

CSC 499/Mentored Research II in Computer Science

CSC 391/Independent Study in Computer Science

Students may take additional Computer Science Options courses, including capstone courses and independent study, for free elective credit with the exception that placement out of WRI 102 or foreign language must be replaced by liberal learning courses, not CSC courses.

**II. Required Mathematics Courses****3 course units**

MAT 127/Calculus A

MAT 128/Calculus B or MAT 205/Linear Algebra

STA 215/Statistical Inference

**III. Computer Science Natural Sciences and Mathematics Options** **4 course units**

Three major-level laboratory sciences and one additional math or science course, with advisement. Consult the department for details.

**IV. Foreign Language Requirements****2 or 3 course units**

Two courses in sequence in any of the modern languages are required if students opt for a language not previously studied in high school or another institution.

Alternatively, students continuing a foreign language previously taken in high school or at another institution must take three courses of that language in sequence. However, this requirement may be reduced by taking a placement test in that language. Based on the student's performance on that test, 0, 1, 2, or 3 courses may be required.

Any course reduction in foreign language requirements results in an equivalent number of free elective courses, which must be selected from the areas of art, humanities, social science or history. Consult the department for details.

*Note: Arabic 151 and 152; Chinese 151 and 152; Japanese 151 and 152; and Russian 151 and 152 are one semester intensive courses and carry two course units of credit each. Students should take this into account when planning a normal four-course semester.*

**Program Entrance, Retention, and Exit Standards**

Every major program at the College has set standards for allowing students to remain in that program, to transfer within the College from one program to another, and to graduate from a program. The following are the standards for the computer science program. Minimum grades are noted in parentheses.

- Students must successfully complete the Introductory Core and Calculus A before taking courses in the Advanced Core or CS Options. Successful completion is indicated by a grade of C or higher in each of these courses:
  - (i) CSC 220\*/Computer Science I: Computational Problem Solving (C)
  - (ii) CSC 230\*/Computer Science II: Data Structures (C)
  - (iii) CSC 270/Discrete Structures (C)
  - (iv) MAT 127/Calculus A (C).
  
- Retention in the program is based on making adequate progress towards meeting the requirements of the major, and the following minimum performance standards in these "critical content courses":
  - (i) overall GPA of 2.0 higher
  - (ii) CSC 220\*/Computer Science I: Computational Problem Solving (C)
  - (iii) CSC 230\*/Computer Science II: Data Structures (C)
  - (iv) CSC 270/Discrete Structures (C)
  - (v) CSC 335/ Analysis of Algorithms (C)
  - (vi) MAT 127/ Calculus A (C).
  
- For transfer into the program from another program within the College, students are required to meet the following minimum performance standards:
  - (i) overall GPA of 2.0 higher
  - (ii) CSC 220/Computer Science I: Computational Problem Solving (C) and
  - (iii) MAT 127/Calculus A (C).
  
- Graduation requires a minimum GPA of 2.0 in computer science courses, minimum GPA of 2.0 overall, and the following minimum performance standards in these "critical content courses":
  - (i) overall GPA of 2.0 higher
  - (ii) CSC 220\*/Computer Science I: Computational Problem Solving (C)
  - (iii) CSC 230\*/Computer Science II: Data Structures (C)

- (iv) CSC 270/Discrete Structures (C)
- (v) CSC 335/ Analysis of Algorithms (C)
- (vi) MAT 127/ Calculus A (C).

*\*When CSC 250/Accelerated CS I and II (one course unit) is used to fulfill the CSC 220 and 230 requirement, the same standard of minimum grade of C is required.*

### Computer Science Minor

**5 course units**

#### I. Required Courses (four course units)

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| 1. CSC 220*/CS I: Computational Problem Solving    | 1 course unit |
| 2. CSC 230*/CS II: Data Structures                 | 1 course unit |
| 3. CSC 270/Discrete Structures of Computer Science | 1 course unit |
| 4. CSC 415/Software Engineering                    | 1 course unit |

#### II. Options for Computer Science Minor (one or two\* course units)

One advanced computer science course (300 or 400 level), with the approval of the department.

*\* A student who has taken CSC 250 prior to adding the Computer Science minor and wishes to use this course to meet the CSC 220 and CSC 230 requirement must successfully complete an entrance test in C++. If the substitution is approved, the student must take an additional CS Option course to meet the Computer Science minor requirements.*

Minimum grade point average for retention and completion for the minor is based on the following minimum performance standards in these “critical content courses”:

- (i) CSC 220\*/Computer Science I: Computational Problem Solving (C);
- (ii) CSC 230\*/Computer Science II: Data Structures (C);
- (iii) CSC 270/Discrete Structures of Computer Science (C);
- (iv) CSC 415/Software Engineering (C);
- (v) Minimum GPA of 2.0 in computer science courses.

### Department Academic Regulations

A minimum of 6 course units in the major must be earned in the department. A minimum of 4 course units of the final 6 in the major must be earned in the department.

CSC 101, CSC 102, CSC 104, CSC 105, CSC 215, HON 280, CSC 365 and CSC 465 do not count toward the required or options courses in the computer science major or minor. These courses may be taken by computer science majors only if they fulfill requirements / required options for other majors or as free electives with permission of the department.

**Suggested Course Sequence****First-Year****Fall**

CSC 099/Orientation to Computer Science	0 course unit
CSC 220/CS I: Computational Problem Solving	1 course unit
MAT 127/Calculus A	1 course unit
FSP First Seminar	1 course unit
Liberal Learning (Foreign Language suggested)*	1 course unit

\*Note: *Arabic 151 and 152, Chinese 151 and 152, Japanese 151 and 152, and Russian 151 and 152 (offered annually); are intensive courses and carry two course units of credit each. Students should take this into account when planning a normal four-course semester.*

**Spring**

CSC 230/CS II: Data Structures	1 course unit
CSC 270/Discrete Structures	1 course unit
MAT 128/Calculus B	

*or*

MAT 205/Linear Algebra	1 course unit
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*or*

WRI 102/Academic Writing (if not exempted)	
Liberal Learning (Foreign Language suggested)*	1 course unit

\*Note: *Arabic 151 and 152, Chinese 151 and 152, Japanese 151 and 152, and Russian 151 and 152 are intensive courses and carry two course units of credit each. Students should take this into account when planning a normal four-course semester.*

**Total****8 course units****Second-Year**

CSC 199/ CS Professional Development Seminar	0.25 course unit
CSC 325/Computer Architecture	1 course unit
CSC 335/Analysis of Algorithms	1 course unit
CSC 345/Operating Systems	1 course unit
CSC Option Course	1 course unit

MAT 128/Calculus B *or* MAT 205/Linear Algebra  
(if WRI 102 was not exempted)

*or*

Free Elective (CSC 105 suggested for free elective credit)	1 course unit
STA 215/Statistical Inference	1 course unit
Natural Sciences (major-level; with lab)	1 course unit
Liberal Learning (Foreign Language suggested)	1 course unit

**Total****8.25 course units****Third-Year (for majors intending to apply for jobs in the industry)**

CSC 299/Junior Seminar in Computer Science	0.25 course unit
CSC Option Course	1 course unit
CSC 415/Software Engineering	1 course unit
CSC Option Course	1 course unit
Natural Sciences (major-level; with lab)	2 course units
Liberal Learning	2 course units
Free Elective	1 course unit

**Total****8.25 course units**

**Third-Year (for majors intending to apply for graduate school)**

CSC 299/Junior Seminar in Computer Science	0.25 course unit
CSC Capstone Course	1 course unit
CSC 415/Software Engineering	1 course unit
CSC 445/Theory of Computation	1 course unit
Natural Sciences (major-level; with lab)	2 course units
Liberal Learning	2 course units
Free Elective (CSC 498 or 499 recommended)	1 course unit

**Total** **8.25 course units**

**Fourth-Year (for majors intending to apply for jobs in the industry)**

CSC 435/Programming Languages	
<i>or</i>	1 course unit
CSC 445/Theory of Computation	
CSC Capstone Course	1 course unit
Math or Science Option (major-level)	1 course unit
Liberal Learning	3 course units
Free Electives	2 course units

**Total** **8 course units**

**Fourth-Year (for majors intending to apply for graduate school)**

CSC Option Course	1 course unit
CSC Option Course (CSC 435 recommended)	1 course unit
Free Elective (CSC 498 or 499 recommended)	1 course unit
Math or Science Option	1 course unit
Liberal Learning	3 course units
Free Elective	1 course unit

**Total** **8 course units**