Computer Science

Faculty: Pulimood *Chair;* DePasquale, Kim, Knox, Li, Martinovic, Papamichail, Salgian
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 specialists, as well as to provide a strong background for advanced study. The BS in Computer Science is accredited by the Computing Accreditation Commission of ABET, http://www.abet.org. All students take courses in problem solving and programming fundamentals, software engineering, data structures, computer architecture, operating systems, programming languages or theory of computation, and algorithm analysis. Upper-level options support an in-depth examination of a range of subdisciplines including, but not limited to, artificial intelligence, database systems, graphics, information retrieval, networks, security, game design and development, bioinformatics, and compilers. Special topics courses offered each semester provide the opportunity to study and work with the latest trends in technology. Students participate in research and/or industry experiences which culminate in professional presentations. Students balance 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. Required Computer Science Courses (eight or nine* course units)

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

**CSC 250/Accelerated CS I and II (one course unit) taken by permission of the department may fulfill the CSC 220 and 230 requirement in which case the student is required to take an additional (4th) Computer Science option course.*

Additional Required Courses (six course units)

CSC 270/Discrete Structures (formerly CSC 310)	1 course unit
CSC 325/Computer Architecture	1 course unit
CSC 335/Analysis of Algorithms (formerly CSC 410)	1 course unit
CSC 345/Operating Systems	1 course unit
CSC 415/Software Engineering (formerly CSC 260)	1 course unit
CSC 435/Programming Languages (formerly CSC 390)	
or	1 course unit
CSC 445/Theory of Computation (formerly CSC 460)	
CSC 399/Internship	
or	1 course unit
CSC 498/Mentored Research I in Computer Science	

II. Computer Science Options (four or five* course units)
Select three courses from the following "Part A" list. Students who take CSC 250 to satisfy the CSC 220 and 230 requirement must select four courses from the "Part A" list. Students may take additional options courses for free elective credit with one exception: placement out of WRI 102 or foreign language must be replaced by liberal learning courses, not CSC courses.

PART A: Choose three or four* courses from the following: 3 (or 4*) course units
- CSC 307/Data Mining and Predictive Modeling
- CSC 315/Database Systems
- CSC 320/Information Retrieval
- CSC 350/Computer Graphics
- CSC 360/Computer Networking
- CSC 365/Games I: Design and Architecture
- CSC 380/Artificial Intelligence
- CSC 425/Compilers and Interpreters (formerly CSC 434)
- CSC 450/Computer and Network Security
- CSC 465/Games II: Implementation and Project Management
- CSC 470/Topics in Computer Science
- CSC 471/Genomics and Bioinfomatics

**When CSC 250/Accelerated CS I and II (one course unit) is used to fulfill the CSC 220 and 230 requirement, the student is required to take an additional (4th) Computer Science option course from PART A — by permission*

PART B:
(Capstone Courses) 1 course unit
- CSC 399/Internship in Computer Science
- CSC 498/Mentored Research I in Computer Science
- CSC 499/Mentored Research II in Computer Science

Up to three capstone courses may be chosen, selected with advisement and departmental approval. The additional capstone course(s) may apply toward the Part A options, with departmental approval. CSC 391/Independent Study in Computer Science also requires departmental approval.

III. Required Mathematics Courses 3 course units
- MAT 127/Calculus A
- MAT 128/Calculus B or MAT 205/Linear Algebra
- STA 215/Statistical Inference

IV. 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.

V. 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:

- Retention in the program is based on the following minimum performance standards in these "critical content courses": CSC 220*/Computer Science I: Computational Problem Solving (C); CSC 230*/Computer Science II: Data Structures (C); CSC 270/Discrete Structures of Computer Science (C); CSC 335/ Algorithms (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) MAT 127/Calculus A (C), and (iii) CSC 220/Computer Science I: Computational Problem Solving or CSC 250 "Accelerated CS I & II" (C).
- Graduation requires a minimum GPA of 2.0 in computer science courses and minimum GPA of 2.0 overall.

**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)

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 (or two*) additional course(s) chosen from the following:

CSC 315, CSC 320, CSC 325, CSC 335, CSC 345, CSC 350, CSC 360, CSC 365, CSC 380, CSC 415, CSC 425, CSC 435, CSC 450, CSC 465 or CSC 470.

Minimum grade point average for retention and completion for the minor is the same as for the major.

**When CSC 250/Accelerated CS I and II (one course unit) is used to fulfill the CSC 220 and 230 requirement, the student is required to take an additional (2nd) Computer Science option course from the list above — by permission.*

Department Academic Regulations

A minimum of 5.25 course units in the major must be earned in the department. A minimum of 3.75 course units of the final 5.25 (equals 15 of the final 21 credits) in the major must be earned in the department.

CSC 101, CSC 102, CSC 104, CSC 105, CSC 215, and HON 280 do not count toward the required or options courses in the computer science major or minor and 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 (CSCA)

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

**Selected to fulfill a Liberal Learning requirement for Arts and Humanities or Social Sciences and History.*

**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	
MAT 128/Calculus B	
or	
MAT 205/Linear Algebra	1 course unit
WRI 102/Academic Writing (if not exempted)	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 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 (plus CSC 099 Orientation Seminar)**

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 (Part A list)	1 course unit
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 Option Course (Part A list)	1 course unit
CSC 415/Software Engineering	1 course unit
CSC Option Course (Part A list)	1 course unit
Natural Sciences (major-level; with lab)	2 course units
Liberal Learning	2 course units
Free Elective	1 course unit
Total	**8 course units**

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

CSC Capstone Course (Part B list)	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 course units**

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

CSC 435/Programming Languages	
or	1 course unit
CSC 445/Theory of Computation	
CSC Capstone Course (Part B list)	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 (Part A list)	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**