

Carnegie Mellon

B.S. in Computer Science

<http://www.csd.cs.cmu.edu/education/bscs/>

4 de fevereiro de 2013

Department

One of the first CS departments in the world in 1965, centerpiece of the School of Computer Science:

- ▶ Entertainment Technology Center
- ▶ Human-Computer Interaction Institute
- ▶ Institute for Software Research
- ▶ Language Technologies Institute
- ▶ Machine Learning Department
- ▶ Robotics Institute

BS in Computer Science

Formação **sólida em CS** com possibilidade de **aprofundamento** em outras áreas:

*“The B.S. program in Computer Science **combines** a **solid** core of **Computer Science** courses with the **ability** to gain substantial **depth in another area** through a required minor in a second subject.”*

BS in Computer Science

Disciplinas de outras de áreas, flexibilidade:

“In addition, the curriculum provides numerous choices for science and humanities courses. As computing is a discipline with strong links to many fields, this provides students with unparalleled flexibility to pursue allied (or non-allied) interests.”

BS in Computer Science

Conhecimento não perecível. . . fundamentos:

*“The curriculum’s **mathematics and probability** component **ensures** that students have the **formal tools** to remain current **as technologies and systems change**, rather than be limited by a narrow focus on programming alone.”*

BS in Computer Science

Disciplinas de projeto:

*“At the same time, students gain insight into the practical issues of building and maintaining systems by **participating in intensive project-oriented courses**”.*

BS in Computer Science

Estágio de pesquisa?:

“Due to the tremendous number of ongoing research projects within the School, many students obtain part-time or summer jobs, or receive independent study credit, working on research while pursuing their undergraduate degree.”

BS in Computer Science

IC? A caminho da pós?:

“ Students seeking a research/graduate school career may pursue an intensive course of research, equivalent to four classroom courses, culminating in the preparation of a senior research honors thesis. ”

BS in Computer Science

Computação em outros institutos:

“Computation-oriented programs are also available within the Departments of Biology, Chemistry, Physics, Electrical and Computer Engineering, Information Systems, Philosophy, Psychology, and Design. Also, a double major in Human-Computer Interaction is available jointly with the College of Humanities & Social Sciences. “

Bachelor of Science in Computational Biology

Bachelor of Computer Science and Arts

Bachelor of Science in Music and Technology

B.S. curriculum in Computer Science

Requires a minimum of 360 units and can be **divided into the following sections:**

- ▶ Computer Science
- ▶ Mathematics/Probability
- ▶ Engineering and Natural Sciences
- ▶ Humanities and Arts
- ▶ Required Minor
- ▶ Computing @ Carnegie Mellon
- ▶ Free Electives

Computer Science

- ▶ 15-128 Freshman Immigration Course
- ▶ 15-122 Principles of Imperative Computation
(students with no prior programming experience take 15-112 Fundamentals of Programming before 15-122)
- ▶ 15-150 Principles of Functional Programming
- ▶ 15-151 Mathematical Foundations of CS
- ▶ 15-210 Parallel and Sequential Data Structures and Algorithms
- ▶ 15-213 Introduction to Computer Systems
- ▶ 15-251 Great Theoretical Ideas in Computer Science
- ▶ 15-451 Algorithm Design and Analysis

Computer Science

One Communications course:

- ▶ 15-221 Technical Communication for Computer Scientists

Computer Science

One Algorithms & Complexity elective:

- ▶ 15-354 Computational Discrete Mathematics
- ▶ 15-355 Modern Computer Algebra
- ▶ 15-453 Formal Languages, Automata, and Computability
- ▶ 21-301 Combinatorics
- ▶ 21-484 Graph Theory
- ▶ others as designated

Computer Science

One Applications elective:

- ▶ 02-450 Automation of Biological Research
- ▶ 05-391 Designing Human-Centered Software
- ▶ 05-431 Software Structures for User Interfaces
- ▶ 10-601 Machine Learning
- ▶ 11-411 Natural Language Processing
- ▶ 15-313 Foundations of Software Engineering
- ▶ 15-322/15-323 Intro to Computer Music/Computer Music Systems & Info Processing

Computer Science

One Applications elective (continuação):

- ▶ 15-381 Artificial Intelligence: Representation and Problem Solving
- ▶ 15-415 Database Applications
- ▶ 15-462 Computer Graphics
- ▶ 16-384 Robot Kinematics and Dynamics
- ▶ 16-385 Computer Vision
- ▶ others as designated

Computer Science

One **Logics & Languages** elective:

- ▶ 15-312 Foundations of **Programming Languages**
- ▶ 15-317 **Constructive Logic**
- ▶ 15-414 Bug Catching: Automated Program **Verification and Testing**
- ▶ 21-300 Basic **Logic**
- ▶ 80-311 **Computability and Incompleteness**
- ▶ others as designated

Computer Science

One **Software Systems** elective:

- ▶ 15-410 **Operating System** Design and Implementation
- ▶ 15-411 **Compiler** Design
- ▶ 15-418 **Parallel Computer** Architecture and Programming
- ▶ 15-440 **Distributed Systems**
- ▶ 15-441 **Computer Networks**
- ▶ others as designated

Computer Science

Two Computer Science electives (can be from any SCS department; usually 200-level or above):

- ▶ CSD [15-xxx],
- ▶ Lane Center [02-],
- ▶ HCI [05-], Human-Computer Interaction
- ▶ ISR [08-,17-], Institute for Software
- ▶ MLD [10-], Machine Learning
- ▶ LTI [11-], Language Technologies
- ▶ RI [16-]), Robotics

Mathematics/Probability

- ▶ 21-120 Differential & Integral Calculus
- ▶ 21-122 Integration, Differential Equations, and Approximation

Mathematics/Probability

One of the following **Linear Algebra** courses:

- ▶ 21-241 Matrices and Linear Transformations
- ▶ 21-242 Matrix Theory
- ▶ 21-341 Linear Algebra

Mathematics/Probability

One of the following Probability courses:

- ▶ 15-359 Probability and Computing
- ▶ 21-325 Probability
- ▶ 36-217 Probability Theory and Random Processes
- ▶ 36-225 Introduction to Probability and Statistics I

Engineering and Natural Sciences

Four engineering or science courses are required, of which at least one must have a laboratory component and at least two must be from the same department.

Engineering and Natural Sciences

At present, courses meeting the **lab requirement** are:

- ▶ 02-261 Quantitative Cell and **Molecular Biology Laboratory**
- ▶ 09-101 Introduction to **Experimental Chemistry** (this 3 unit lab together with 09-105, Introduction to **Modern Chemistry**, satisfies the lab requirement)
- ▶ 15-321 Research Methods for **Experimental Computer Science**
- ▶ 27-100 Engineering the **Materials of the Future**
- ▶ 33-104 Experimental **Physics**
- ▶ 85-310 Research Methods in **Cognitive Psychology**

Humanities and Arts

All candidates for the bachelor's degree must complete a minimum of 63(?) units offered by the College of Humanities & Social Sciences and/or the College of Fine Arts.

The humanities and arts (or general education) courses for SCS students are to meet the distribution requirements found on the SCS Humanities and Arts page.

Business, Economics, Philosophy, Psychology, Social & Decision Sciences

Required Minor

A sequence of courses prescribed by the requirements of the particular department.

Completion of a **second major** (or double degree) also satisfies this requirement. If permitted by the **minor or second major** department, courses taken in satisfaction for the **minor or second major** may also count toward any category other than required courses in Computer Science.

More information can be found on the minor requirement page.

Computing @ Carnegie Mellon

The following **course is required** of all students to familiarize them with the **campus computing environment**:

- ▶ 99-10x Computing @ Carnegie Mellon

Free Electives

A **free elective** is any Carnegie Mellon course.