Computer Science

Computer Science Major

The computer science undergraduate programs, based on recommendations of the Association for Computing Machinery, consist of a core of courses required for majors and a large selection of service courses and advanced courses. A grade of 'C' or better is required in all Computer Science courses. In the core, students are offered an opportunity to study concepts, applications, and implementation techniques that provide a broad practical base for both further study and a career in computing. Through a variety of service courses, every student in the university is provided an opportunity to develop computer literacy or competency. Through advanced undergraduate and graduate courses, students are offered an opportunity for in-depth study of such topics as artificial intelligence, programming languages, mobile applications, computer networks, security, information assurance, office automation, bioinformatics, software development, data mining, and data base management systems. Students are encouraged to choose elective courses from related areas including business, economics, engineering, mathematics, operations research, and statistics.

After completing part of their studies, students will find many opportunities to work part time as a research assistant to a scientist on campus, or as an intern with a local business, applying what they have learned in the classroom. Cooperative education opportunities starting in the junior year are available.

The B.A. concentrates on web development. Students receive an applied grounding in application design, web development, and deployment.

The B.S. program provides the widest exposure to computing with emphasis on high level languages, software development and advanced mathematical concepts.

Top students are encouraged to inquire about the 4+1 program providing a fast track through graduate school resulting in combined Bachelor's and Master's Degrees.

Computer Science Minor

A minor in Computer Science requires at least 17 semester hours of select computer science courses. A grade of 'C' or better is required in all courses applied toward the computer science minor.

Major Requirements

Major: Computer Science

Degree Type: B.S.
Minimum Degree Credits to Graduate: 122

General Education Requirements for Baccalaureate Degree

- A list of approved general education courses is available here (http://bulletin.ndsu.edu/past-bulletin-archive/2017-18/academic-policies/undergraduate-policies/general-education/#genedcoursestext) .
- General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review the major, minor, and program emphases requirements for minimum grade restrictions, should they apply.

Code	Title	Credits
Communication (C)		12
ENGL 110	College Composition I	
ENGL 120	College Composition II	
COMM 110	Fundamentals of Public Speaking	
Upper Division Writing [†]		
Quantitative Reasoning (R) [†]		3
Science and Technology (S) [†]		10
Humanities and Fine Arts (A) [†]		6
Social and Behavioral Sciences (B) [†]		6
Wellness (W) [†]		2
Cultural Diversity (D) [*†]		
Global Perspectives (G) [*†]		
Total Credits		39

*   May be satisfied by completing courses in another General Education category.

†   May be satisfied with courses required in the major. Review major requirements to determine if a specific upper division writing course is required.

College Requirements

Code	Title	Credits
Bachelor of Arts (BA) Degree – An additional 12 credits Humanities and Social Sciences and proficiency at the second year level in a modern foreign language. [*]		12
Bachelor of Science (BS) Degree – An additional 6 credits in Humanities or Social Sciences [*]		6

*   Humanities and Social Sciences may be fulfilled by any course having the following prefix: ADHM, ANTH, ARCH, ART, CJ, CLAS, COMM, ECON, ENGL, FREN, GEOG, GERM, HDFS, HIST, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WGS, or any course from the approved list of general education courses in humanities and social sciences (general education categories A and B). These credits must come from outside the department of the student's major.

Major Requirements

A Grade of 'C' or better is required for all CSCI prefix courses.

Code	Title	Credits
B.S. Computer Science Core Requirements		
CSCI 160	Computer Science I	4
CSCI 161	Computer Science II	4
CSCI 189	Skills for Academic Success [1]	1
CSCI 213	Modern Software Development	3
CSCI 222	Discrete Mathematics	3
CSCI 313	Software Development for Games	3
CSCI 336	Theoretical Computer Science	3
CSCI 366	Database Systems	3
CSCI 372	Comparative Programming Languages	3
CSCI 374	Computer Organization and Architechure	3
CSCI 415	Networking and Parallel Computation	3
CSCI 445	Software Projects Capstone [2]	3
CSCI 467	Algorithm Analysis	3
CSCI 474	Operating Systems Concepts	3
CSCI 489	Social Implications of Computers [2]	3
ENGL 321	Writing in the Technical Professions (May satisfy general education category C)	3
or ENGL 324	Writing in the Sciences	
MATH 165	Calculus I (May satisfy general education category R)	4
MATH 166	Calculus II	4
STAT 367	Probability	3
STAT 368	Statistics	3
Computer Science Electives: Select 3 courses from the list below.		9
Note: Students seeking recognition of cyber-security skills should follow the cyber-security section below.		
CSCI 345	Topics on Personal Computers	
CSCI 371	Web Scripting Languages	
CSCI 413	Principles of Software Engineering	
CSCI 418	Simulation Models	
CSCI 426	Introduction to Artificial Intelligence	
CSCI 428	Computational Techniques for Environmental Sustainability	
CSCI 450	Cloud Computing	
CSCI 453	Linear Programming and Network Flows	
CSCI 454	Operations Research	
CSCI 458	Microcomputer Graphics	
CSCI 459	Foundations of Computer Networks	

CSCI 462	Mobile and Wireless Networks	
CSCI 469	Network Security	
CSCI 473	Foundations of the Digital Enterprise	
CSCI 476	Computer Forensics	
CSCI 477	Object-Oriented Systems	
CSCI 479	Introduction to Data Mining	
CSCI 488	Human-Computer Interaction	
CSCI 491	Seminar (Cyber-Security Focus)	
CSCI 499	Special Topics	
MIS 412	Computer Crime, Forensics, and Investigation	
MIS 415	Managing Information Technology Security	
Total Credits		71

Cyber-security

Cyber-security is optional - students interested in pursuing recognition of their achievement in cyber-security core concepts should take the B.S. Core Requirements as indicated above, as well as the additional courses listed here. This sequence satisfies the Computer Science elective courses required for the B.S. degree.

Code	Title	Credits
CSCI 491	Seminar (Cyber-Security Focus)	3
MIS 415	Managing Information Technology Security	3
One of the following:		3
CSCI 473	Foundations of the Digital Enterprise	
CSCI 345	Topics on Personal Computers (Cyber-Security Focus)	
CSCI 499	Special Topics (Cyber-Security Focus)	
MIS 412	Computer Crime, Forensics, and Investigation	
Total Credits		9

[1] CSCI 189 is only required for first-time, first-year students--A first-time, first-year student is defined as a student who has not yet completed a college course as a college student. Students that are not first-time, first-year students that either transfer into the university or change their major are not required to take CSCI 189.

[2] Together, CSCI 445 Software Projects Capstone (typically taken during the last spring semester prior to degree completion) & CSCI 489 Social Implications of Computers (typically taken during the last fall semester prior to degree completion), form the department capstone.

Major Requirements

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Minimum Degree Credits to Graduate: 122

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[*]   May be satisfied by completing courses in another General Education category.

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Major Requirements

A Grade of 'C' or better is required for all CSCI prefix courses.

Code	Title	Credits
B.A. Computer Science Core Requirements		
CSCI 114	Microcomputer Packages (May satisfy general education category S)	3
or MIS 116	Business Use of Computers	
CSCI 159	Computer Science Problem Solving	3
CSCI 160	Computer Science I	4
CSCI 161	Computer Science II	4
CSCI 189	Skills for Academic Success [1]	1
CSCI 213	Modern Software Development	3
CSCI 222	Discrete Mathematics	3
CSCI 313	Software Development for Games	3
CSCI 366	Database Systems	3
CSCI 371	Web Scripting Languages	3
CSCI 445	Software Projects Capstone [2]	3
CSCI 488	Human-Computer Interaction	3
CSCI 489	Social Implications of Computers [2]	3
Related Courses		
COMM 260	Introduction to Web Design	3
COMM 261	Introduction to Web Development	3
ENGL 321	Writing in the Technical Professions (May satisfy general education category C)	3
or ENGL 324	Writing in the Sciences	
MATH 146	Applied Calculus I (May satisfy general education category R)	4
or MATH 165	Calculus I	
STAT 330	Introductory Statistics	3
STAT 331	Regression Analysis	2
Other Courses: Select these seven credits from the following areas:		7
Science (cannot be courses with the CSCI prefix)		
Engineering (cannot be ENGR 311 or ENGR 312)		
Math (a course with a number higher than MATH 147, but not MATH 165)		

Statistics (cannot be STAT 330 or STAT 331)	
Total Credits	64

[1] CSCI 189 is only required for first-time, first-year students--A first-time, first-year student is defined as a student who has not yet completed a college course as a college student. Students that are not first-time, first-year students that either transfer into the university or change their major are not required to take CSCI 189.

[2] CSCI 445 Software Projects Capstone & CSCI 489 Social Implications of Computers form the department capstone. CSCI 445 is typically taken during the last spring semester and CSCI 489 is typically taken during the last fall semester prior to degree completion.

Minor Requirements

Computer Science Minor

Minor Requirements

Required Credits: 17

Code	Title	Credits
Required Courses		
CSCI 213	Modern Software Development	3
Choose one of the following two sequences:		7-8
CSCI 160 & CSCI 161	Computer Science I and Computer Science II	
CSCI 227 & CSCI 161	Computing Fundamentals I and Computer Science II	
Additional Electives: Select 7-8 credits (at least 3 credits must be CSCI 300-400 level).		7-8
Total Credits		17-19

Minor Requirements and Notes

- A minimum of 8 credits must be taken at NDSU.
- A grade of 'C' or better is required in all courses applied to the computer science minor.

B.S. Calculus Ready 4- year plan

Freshman			
Fall	**Credits**	**Spring**	**Credits**
CSCI 160	4	CSCI 161	4
CSCI 189	1	MATH 166	4
MATH 165	4	Lab Science II	4-5
Lab Science I	4-5	General Ed (HUM/FA)	3
ENGL 110 or 120	3-4		
	16-18		15-16
Sophomore			
Fall	**Credits**	**Spring**	**Credits**
CSCI 213	3	CSCI 313	3
CSCI 222	3	CSCI 336	3
COMM 110	3	General Ed (SOC/BehSci)	3
General Ed SOC/BehSci	3	Add'l Gen Ed I	3
Science elective	3	Wellness	2-3
	15		14-15
Junior			
Fall	**Credits**	**Spring**	**Credits**
CSCI 372	3	CSCI 467	3
STAT 367	3	STAT 368	3

	Credits		Credits
CSCI 366	3	CSCI 374	3
General Ed (HUM/FA)	3	Add'l Gen Ed II	3
CSCI Elective I	3	ENGL 321 or 324	3
	15		15
Senior			
Fall	**Credits**	**Spring**	**Credits**
CSCI 489	3	CSCI 415	3
CSCI 474	3	CSCI 445	3
CSCI elective II	3	CSCI Elective III	3
Additional Elective	3	Additional Elective	3
	12		12

Total Credits: 114-118

B.S. Student needs preparatory MATH course(s)

Freshman	
Fall	**Credits**
CSCI 122	3
or	
CSCI 159	3
CSCI 189	1
ENGL 110	4
or	
ENGL 120	3
Lab Science I	
Pre-Calculus course *per placement	
	14

Total Credits: 14