

COMPUTER SCIENCE BACHELOR OF SCIENCE

Leading to the Bachelor of Science Degree in Computer Science

The Bachelor of Science in Computer Science program is accredited by the Computing Accreditation Commission of ABET (<http://www.abet.org>).

Students in Computer Science (BCOS) gain valuable skills in software design, programming languages, systems, and development in high-level computer languages. Related courses including databases, software engineering, networking, and operating systems are also integral in this program. Elective courses are available in a wide variety of computing areas including web development, mobile development, embedded computing, artificial intelligence, machine learning, and cybersecurity. Students also apply these skills directly in the work environment through two required co-op work semesters beginning junior year.

Program Educational Objectives

Within three to five years of graduation:

- Graduates are proficient in applying computer science principles and best practices to problems in the workplace.
- Graduates attain productive and challenging computer science and/or software engineering careers in private practice, industry, or government.
- Graduates are engaged in continuing professional development or professional societies in computer science or a related computing field.
- Graduates follow standards set forth by professional societies of which they are members.

Student Outcomes

Graduates of the program will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

Three Year Program

Total credits for degree: 120

This is a three-year program, starting in the fall semester of the student's first year and planned to end in the summer semester of the student's third year. The courses are as follows:

Course	Title	Credits
Freshman Year		
Fall Semester		
COMP1000	COMPUTER SCIENCE I	4
MATH1776	CALCULUS 1A	2
MATH1777	CALCULUS 1B	2
MATH2300	DISCRETE MATHEMATICS	4
Science Elective ²		4
English Sequence*		4
Credits		20
Spring Semester		
COMP1050	COMPUTER SCIENCE II	4
COMP1200	COMPUTER ORGANIZATION	4
MATH1876	CALCULUS 2A	2
MATH1877	CALCULUS 2B	2
Science Elective ²		4
English Sequence*		4
Credits		20
Sophomore Year		
Fall Semester		
COMP2000	DATA STRUCTURES	4
COMP2100	NETWORK PROGRAMMING	4
COMP2650	DATABASES	4
MATH2860	LINEAR ALGEBRA & MATRIX THEORY	4
HSS Elective*		4
Credits		20
Spring Semester		
COMP2350	ALGORITHMS	4
COMP3400	OPERATING SYSTEMS	4
COMP Computer Science Elective ¹		4
MATH2100	PROBABILITY & STATISTICS FOR ENGINEERS	4
HSS Elective*		4
Credits		20
Summer Semester		
COOP3500	COOP EDUCATION 1	
Credits		0
Junior Year		
Fall Semester		
COMP3350	PROGRAMMING LANGUAGES	4
COMP4960	SOFTWARE ENGINEERING	4
COMP Computer Science Elective ¹		4
COMP Elective Computer Science Elective ¹		4
GENERAL Elective		4
Credits		20
Spring Semester		
COOP4500	COOP EDUCATION 2	
Credits		0
Summer Semester		
COMP3450	PARALLEL COMPUTING AND DISTRIBUTED COMPUTING	4
COMP5500	SENIOR PROJECT	4

Course	Title	Credits
COMP Computer Science Elective ¹		4
HSS Elective*		4
GENERAL Elective		4
	Credits	20
	Total Credits	120

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Computer Science students take a total of four computer science electives. Students must select four courses from the list of Computer Science Electives. The Computer Science Elective courses to be offered in a particular semester will be selected by the School of Computing and Data Science.

2

BCOS students must take two lab-based science electives selected from the list of approved science courses.

ENGL/HSS Note

Students are required to complete:

- At least one course in Humanities: CSAS, HSSI, HIST, HUMN, LITR and PHIL
- At least one course in the Social Sciences: CSAS, HSSI, COMM, ECON, ENVM, POLS, PSYC and SOCL
- The remaining course from either the Humanities or Social Sciences category.

Students with a three English course sequence may use the third English course to satisfy a Humanities requirement.

A minimum of 20 credits total, including English, humanities, and social science credit, is required to complete the humanities and social sciences graduation requirement.

Of the three listed humanities and social science electives, BCOS students must include the one Directed Elective:

- **An Ethics elective**

Math Placement (<https://catalog.wit.edu/academic-policies-procedures/ug/math-placement/>) may alter the course schedule above.

Computer Science Electives, select four courses from the following list:

The Computer Science Elective courses may include, but are not limited to:

Course	Title	Credits
COMP1150	ROUTING AND SWITCHING	4
COMP2150	NETWORK ADMINISTRATION	4
COMP2160	WIRELESS NETWORKS	4
COMP2500	SECURITY PRINCIPLES	4
COMP3100	SYSTEM ADMINISTRATION	4
COMP3125	DATA SCIENCE FUNDAMENTALS	4
COMP3200	ASSEMBLY LANGUAGE	4
COMP3500	NETWORK SECURITY	4
COMP3550	COMPUTER SECURITY	4
COMP3575	SCRIPTING FOR CYBERSECURITY AND FORENSICS	4

Course	Title	Credits
COMP3580	DIGITAL FORENSICS	4
COMP3590	APPLIED CRYPTOGRAPHY	4
COMP3660	MOBILE APP DEVELOPMENT	4
COMP3750	INTRODUCTION TO BIostatISTICS	4
COMP4050	MACHINE LEARNING	4
COMP4150	ADVANCED SYSTEM ADMINISTRATION	4
COMP4450	SYSTEMS PROGRAMMING	4
COMP4460	COMPILERS	4
COMP4500	OFFENSIVE SECURITY	4
COMP4550	INCIDENT RESPONSE & BUSINESS CONTINUITY	4
COMP4580	NETWORK FORENSICS	4
COMP4590	PUBLIC KEY CRYPTOGRAPHY	4
COMP4600	QUANTUM COMPUTING FOR SECURITY	4
COMP4650	WEB DEVELOPMENT	4
COMP4700	ARTIFICIAL INTELLIGENCE	4
COMP4750	EMBEDDED ARTIFICIAL INTELLIGENCE	4
COMP4775	ADVANCED PARALLEL COMPUTING	4
COMP4950	PROJECT MANAGEMENT	4

Science Electives, select two courses from the following list:

Course	Title	Credits
BIOL1100	CELL & MOLECULAR BIOLOGY	4
BIOL1700	ANATOMY & PHYSIOLOGY I	4
BIOL2200	ADVANCED MOLECULAR BIOLOGY	4
BIOL3000	APPLICATIONS IN GENETICS	4
CHEM1100	GENERAL CHEMISTRY I	4
CHEM1600	GENERAL CHEMISTRY II	4
PHYS1250	ENGINEERING PHYSICS I	4
PHYS1750	ENGINEERING PHYSICS II	4
PHYS2000	INTRODUCTION TO ASTRONOMY	4
PHYS3100	MODERN PHYSICS	4

The following courses require School approval to satisfy the Science Elective requirement

BIOL2990	INDEPENDENT STUDY IN BIOLOGY	4
BIOL3800	SPECIAL TOPICS IN BIOLOGY	4
CHEM2990	INDEPENDENT STUDY IN CHEMISTRY	4
CHEM3800	SPECIAL TOPICS IN CHEMISTRY	4
PHYS2990	INDEPENDENT STUDY IN PHYSICS	4
PHYS3800	SPECIAL TOPICS IN PHYSICS	4

and General Electives: Select any two 4 credit courses. Four Year Program

Total credits for degree: 120

This is a four-year program, starting in the fall semester of the student's first year and planned to end in the summer semester of the student's fourth year. The courses are as follows:

Course	Title	Credits
Freshman Year		
Fall Semester		
COMP1000	COMPUTER SCIENCE I	4

Course	Title	Credits
MATH1776	CALCULUS 1A	2
MATH1777	CALCULUS 1B	2
MATH2300	DISCRETE MATHEMATICS	4
English Sequence*		4

Credits **16**

Spring Semester

COMP1050	COMPUTER SCIENCE II	4
COMP1200	COMPUTER ORGANIZATION	4
MATH1876	CALCULUS 2A	2
MATH1877	CALCULUS 2B	2
English Sequence*		4

Credits **16**

Sophomore Year**Fall Semester**

COMP2000	DATA STRUCTURES	4
COMP2100	NETWORK PROGRAMMING	4
MATH2860	LINEAR ALGEBRA & MATRIX THEORY	4
HSS Elective*		4

Credits **16**

Spring Semester

COMP2350	ALGORITHMS	4
COMP2650	DATABASES	4
MATH2100	PROBABILITY & STATISTICS FOR ENGINEERS	4
GENERAL Elective		4

Credits **16**

Summer Semester

COOP3000	PRE CO-OP WORK TERM (OPTIONAL)	1
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Credits **1**

Junior Year**Fall Semester**

COMP3400	OPERATING SYSTEMS	4
COMP Computer Science Elective ¹		4
SCIENCE Elective ²		4
HSS Elective*		4

Credits **16**

Spring Semester

COOP3500	COOP EDUCATION 1	
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Credits **0**

Summer Semester

COMP3350	PROGRAMMING LANGUAGES	4
COMP3450	PARALLEL COMPUTING AND DISTRIBUTED COMPUTING	4
COMP Computer Science Elective ¹		4
SCIENCE Elective ²		4

Credits **16**

Senior Year**Fall Semester**

COOP4500	COOP EDUCATION 2	
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Credits **0**

Course	Title	Credits
Spring Semester		
COMP4960	SOFTWARE ENGINEERING	4
COMP Computer Science Elective ¹		4
HSS Elective*		4

Credits **12**

Summer Semester

COMP5500	SENIOR PROJECT	4
COMP Computer Science Elective ¹		4
GENERAL Elective		4

Credits **12**

Total Credits **121**

1

Computer Science students take a total of four computer science electives. Students must select four courses from the list of Computer Science Electives. The Computer Science Elective courses to be offered in a particular semester will be selected by the School of Computing and Data Science.

2

BCOS students must take two lab-based science electives selected from the list of approved science courses.

ENGL/HSS Note

Students are required to complete:

- At least one course in Humanities: CSAS, HSSI, HIST, HUMN, LITR and PHIL
- At least one course in the Social Sciences: CSAS, HSSI, COMM, ECON, ENVM, POLS, PSYC and SOCL
- The remaining course from either the Humanities or Social Sciences category.

Students with a three English course sequence may use the third English course to satisfy a Humanities requirement.

A minimum of 20 credits total, including English, humanities, and social science credit, is required to complete the humanities and social sciences graduation requirement.

Of the three listed humanities and social science electives, BCOS students must include the one Directed Elective:

- **An Ethics elective**

Math Placement (<https://catalog.wit.edu/academic-policies-procedures/ug/math-placement/>) may alter the course schedule above.

Computer Science Electives, select four (4) courses from the following list:

The Computer Science Elective courses may include, but are not limited to:

Course	Title	Credits
COMP1150	ROUTING AND SWITCHING	4
COMP2150	NETWORK ADMINISTRATION	4
COMP2160	WIRELESS NETWORKS	4
COMP2500	SECURITY PRINCIPLES	4
COMP3100	SYSTEM ADMINISTRATION	4

Course	Title	Credits
COMP3125	DATA SCIENCE FUNDAMENTALS	4
COMP3200	ASSEMBLY LANGUAGE	4
COMP3500	NETWORK SECURITY	4
COMP3550	COMPUTER SECURITY	4
COMP3575	SCRIPTING FOR CYBERSECURITY AND FORENSICS	4
COMP3580	DIGITAL FORENSICS	4
COMP3590	APPLIED CRYPTOGRAPHY	4
COMP3660	MOBILE APP DEVELOPMENT	4
COMP3750	INTRODUCTION TO BIostatISTICS	4
COMP4050	MACHINE LEARNING	4
COMP4150	ADVANCED SYSTEM ADMINISTRATION	4
COMP4450	SYSTEMS PROGRAMMING	4
COMP4460	COMPILERS	4
COMP4500	OFFENSIVE SECURITY	4
COMP4550	INCIDENT RESPONSE & BUSINESS CONTINUITY	4
COMP4580	NETWORK FORENSICS	4
COMP4650	WEB DEVELOPMENT	4
COMP4700	ARTIFICIAL INTELLIGENCE	4
COMP4750	EMBEDDED ARTIFICIAL INTELLIGENCE	4
COMP4775	ADVANCED PARALLEL COMPUTING	4
COMP4950	PROJECT MANAGEMENT	4

Science Electives, select two (2) courses from the following list:

Course	Title	Credits
BIOL1100	CELL & MOLECULAR BIOLOGY	4
BIOL1700	ANATOMY & PHYSIOLOGY I	4
BIOL2200	ADVANCED MOLECULAR BIOLOGY	4
BIOL3000	APPLICATIONS IN GENETICS	4
CHEM1100	GENERAL CHEMISTRY I	4
CHEM1600	GENERAL CHEMISTRY II	4
PHYS1250	ENGINEERING PHYSICS I	4
PHYS1750	ENGINEERING PHYSICS II	4
PHYS2000	INTRODUCTION TO ASTRONOMY	4
PHYS3100	MODERN PHYSICS	4

The following courses require School approval to satisfy the Science Elective requirement

BIOL2990	INDEPENDENT STUDY IN BIOLOGY	4
BIOL3800	SPECIAL TOPICS IN BIOLOGY	4
CHEM2990	INDEPENDENT STUDY IN CHEMISTRY	4
CHEM3800	SPECIAL TOPICS IN CHEMISTRY	4
PHYS2990	INDEPENDENT STUDY IN PHYSICS	4
PHYS3800	SPECIAL TOPICS IN PHYSICS	4

and

General Electives: Select any two 4 credit courses.