2023 – 2024 DEGREE WORKSHEET
Bachelor of Science in Computer Science

The Bachelor of Science Degree in Computer Science obtained through the engineering partnership program is conferred by the University of Colorado Boulder. Lower-division coursework is completed through Western Colorado University before applying for admission to the University of Colorado Boulder. The entire program is completed on the campus of Western Colorado University. A student may apply for admission to the Western-University of Colorado Boulder Partnership Program when they have satisfied all criteria of one of the following scenarios:

Scenario One

- Complete a college-level, two-course sequence in calculus with a grade of "B-" or higher
- Complete one college-level physical science course (calculus-based physics and/or college chemistry) with a grade of "B-" or higher
- Maintain a cumulative GPA of 3.0 or higher

Scenario Two

- Complete the course sequence listed on the current Program Sheet/Degree Plan for the first and second years
- Maintain a college cumulative GPA of 3.0 or higher

Student Outcomes. Graduates of this program will have an ability to...

1. analyze a complex computing problem and 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 judgements 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

Program Educational Objectives

The Computer Science program is designed to prepare students for successful careers having positive societal impact in industry, academia, government, and consulting. Our alumni are expected to:

- Apply their engineering and computer science knowledge, critical thinking, creativity, and problem solving skills with integrity and inclusivity in a professional practice or in non-engineering or technical fields, such as law, medicine, or business.
- Continue their intellectual development through graduate education, professional development courses, self-directed investigation, and/or on-the-job training and experience.
- Embrace leadership and collaborative roles in their careers.

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The Bachelor of Science Degree in Computer Science requires:

- Transfer of all coursework listed on the plan of study to the University of Colorado Boulder
- At least 45 credits earned from the University of Colorado Boulder (residency requirement)
- A minimum of 128 credits earned to degree program
- Student knowledge and adherence to course prerequisites as listed in the course catalog
- A cumulative and major GPA of at least 2.00 (from entirely CU Boulder coursework as a student's Western GPA will not continue in the CU Boulder portion of the program)
- Satisfactory completion of all HEAR requirement deficiencies

AP & IB Credit

Partnership students are to adhere to CU Boulder standards for AP and IB Scores (not Western standards). These scores are often higher than the score required for credit from Western (particularly those listed below).

- An AP score of 5 is required on **Physics C: Mechanics** to receive credit for General Physics I (4 credits) at CU Boulder (CU PHYS 1110, Western PHYS 190 + 185).
- An AP score of 5 is required on **Physics C: Electricity & Magnetism** to receive credit for General Physics II (4 credits) at CU Boulder (CU PHYS 1120, Western PHYS 191 + 186).
- An AP score of 4 or higher is required on **Calculus AB** to receive credit for Calculus I (5 credits) at CU Boulder (CU MATH 1300, Western MATH 151)
- An AP score of 4 or higher is required on **Calculus BC** to receive credit for Calculus I (5 credits) and Calculus II (5 credits) at CU Boulder (CU MATH 1300 and 2300, Western MATH 151 and 251)
    - Additionally, a **Calculus BC** score of 3 or higher with an AB sub score of 4 or higher is required to receive credit for Calculus I (5 credits) at CU Boulder (CU MATH 1300, Western MATH 151)
- An AP score of 5 is required on **Chemistry** to receive credit for General Chemistry I with lab (5 credits) at CU Boulder (CU CHEM 1113 and 1114, Western CHEM 121)
- An AP score of 5 is required on either **Computer Science A or Computer Science Principles** to receive credit for Computer Science 1 (4 credits) at CU Boulder (CU CSCI 1300, Western CS 191)

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REQUIRED COURSES

Western coursework is in red font, while CU Boulder coursework is in black font.

College Writing Requirement: 3 credit hours

ENG 302	Technical Writing	3

Humanities and Social Sciences: 15 credit hours, 6 of which must be upper-division

Upper-division Humanities & Social Science:

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Remaining (lower-division) Humanities & Social Sciences:

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Logic and Ethics: 6 credit hours

PHIL 135	Introduction to Ethics	3

One of the following:

PHIL 100	Critical Thinking	3
PHIL 200	Symbolic Logic	3

Mathematics: 17 credit hours

MATH 151	Calculus I	4
MATH 200	Discrete Mathematics	3
MATH 251	Calculus II	4
MATH 314	Probability/Statistics	3
CSCI 2820	Linear Algebra with CS Applications	3

Natural Science: 17 credit hours

PHYS 190	General Physics I	3
PHYS 185	Laboratory Physics I	1

Natural Science Sequence (one of the following):

PHYS 191&186	General Physics II w/ lab	4
BIOL 150	Bio Principles w/ lab	4
CHEM 111&112	General Chem I w/ lab	4
CHEM 121	General Chemistry for Engineers	3

Additional Natural Science hours to reach 17 hours 9-10

Computer Science: 58 credit hours

Computer Science Foundation

HWTR 100	CS-based Headwaters	1
CS 191	Computer Science II	3
CS 280	Data Structures	3
CS 330	Operating Systems and Architecture	3
CS 370	Systems Programming in C	3
CS 412	Software Engineering	3
CSCI 3155	Principles of Programming Languages	4
CSCI 3104	Algorithms	4

Computer Science Core

5 courses from the following:

CSCI 3002	Fundamentals of Human Computer Interaction	4
CSCI 3202	Introduction to AI	3
CSCI 3287	Design & Analysis of Data Systems	3
CSCI 3302	Introduction to Robotics	3
CSCI 3403	Intro to CyberSecurity for a Converged World	4
CSCI 3434	Theory of Computation	3
CSCI 3656	Numerical Computation (or approved substitution)	3
CSCI 3753	Design & Analysis of OS	4
CSCI 4022	Advanced Data Science	3
CSCI 4273	Network Systems	3
CSCI 4448	Object-Oriented Analysis and Design	3

Computer Science Electives

Additional upper-division CSCI courses to bring total computer science hours to 58 or higher

Senior Capstone

CSCI 4308	Software Engineering Project I	4
CSCI 4318	Software Engineering Project II	4

Free Electives: Credit hours variable

Complete enough electives to bring the total credit hours toward the degree to 128. Normally this is 12 credit hours but could vary (for example due to transfer credits). Please consult with your academic advisor with questions.

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TOTAL CREDITS **128**

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ADDITIONAL DEGREE INFORMATION

Acceptable Course Substitutions:
CHEM 111 + 112 (General Chemistry 1 with lab, 4 credits) for CHEM 121 (General Chemistry for Engineers, 3 credits).
To investigate additional course substitutions from Western or another institution, check www.transferology.com to verify how applicable courses will transfer to CU Boulder and discuss options with an Academic Advisor.

Approved Humanities & Social Sciences
At least 15 credit hours in humanities and social sciences are required in order to graduate. A list of acceptable humanities and social sciences with Western can be found on the "Humanities and Social Science Requirements" PDF.

Natural Sciences
A total of at least 17 credit hours of natural sciences are required, with options at Western as follows:

- PHYS 190 + 185 General Physics 1 (with lab, 4 credits)
- One additional Natural Science Sequence from the following: PHYS 191&186 (4 credits), BIOL 150 (4 credits, **will not apply** to partnership admission guidelines), CHEM 111&112 (4 credits), or CHEM 121 (3 credits)
- A minimum of 9 additional Natural Science credit hours from the following:
    - ANTH 218 Physical Anthropology w/ lab (3 credits)*
    - BIOL 130 Environmental Biology (3 credits)
    - BIOL 135 Environmental Biology lab (1 credit)
    - BIOL 150 Biological Principles w/ lab (4 credits)
    - CHEM 111&112 General Chemistry 1 w/ lab (4 credits)
    - CHEM 113&114 General Chemistry 2 w/ lab (4 credits)
    - CHEM 121 General Chemistry for Engineers (3 credits)
    - ENGR 224 Material Science (3 credits)*
    - ENGR 363 Mechanics of Solids (3 credits)*
    - GEOL 101 Physical Geology (3 credits)
    - GEOL 105 Physical Geology lab (1 credit)
    - GEOL 201 Historical Geology (4 credits)
    - MCEN 3012 Thermodynamics (3 credits)* (CU course offered on-campus in Gunnison)
    - PHYS 110 Solar System Astronomy GT (3 credits)*
    - PHYS 191&186 General Physics 2 w/ lab (4 credits)
    - PHYS 250 Statics (3 credits)*
    - PHYS 251 Dynamics (3 credits)*
    - PHYS 320 Modern Physics (3 credits)
    - *Courses approved specifically for Western-CU Boulder partnership program students; not guaranteed for approval on the Boulder campus
- A list of additional course options in Boulder can be found on the main campus CS Degree Plan Natural Science Elective Course List
- Students may petition to count courses not on the above list as natural science credit and should first consult their Academic Advisor

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Headwaters 100
To fulfill the CU Boulder CSCI 1000 (Computer Science as a Field of Work and Study) requirement, Western partnership students must take a computer-science based Headwaters (HWTR 100) section, including Art of Computer Hacking, Computing & Open Spaces, or Let's Get Physical (Computing). Other Headwaters courses do not count towards this requirement.

Computer Science Core
Students are to select five CU Boulder Computer Science Core courses from the following. Students interested in taking courses currently only offered on the Boulder campus or remotely should consult with their Academic Advisor and the CU Boulder CSCI Core Courses List.

- CSCI 3002 Fundamentals of Human Computer Interaction (4 credits)
- CSCI 3202 Intro to Artificial Intelligence (3 credits)
- CSCI 3287 Design & Analysis of Database Systems (3 credits)
- CSCI 3302 Intro to Robotics (3 credits)
- CSCI 3403 Intro to CyberSecurity for a Converged World (4 credits)
- CSCI 3434 Theory of Computation (3 credits)
- CSCI 3656 Numerical Computation, or APPM 4600 Numerical Methods and Scientific Computing, or MCEN 3030 Computational Methods (only one of these will count as Computer Science credit, 3 credits)
- CSCI 3753 Design & Analysis of Operating Systems (4 credits)
- CSCI 4022 Advanced Data Science (3 credits)
- CSCI 4273 Network Systems (3 credits)
- CSCI 4448 Object-Oriented Analysis and Design (3 credits)

Computer Science Electives
Students must complete additional upper division computer science (CSCI) courses to bring the total number of computer science credits to 58 hours or more, including the following which are expected to be offered in Gunnison:

- CSCI 3010 Programming Project Workshop (3 credits)
- CSCI 3022 Introduction to Data Science with Probability and Statistics (3 credits, can count for probability/statistics requirement OR CS elective credit, but not both)
- CSCI 3112 Human-Centered Computing Professional Development (1 credit)
- CSCI 4302 Advanced Robotics (3 credits)
- CSCI 4622 Machine Learning (3 credits)
- CSCI 4849 Input, Interaction, and Accessibility (3 credits)
- MATH 380 Cryptography (3 credits, Western course that can count for CS elective credit, but not towards 45 credit CU Boulder residency requirement)
- MCEN 3017 Circuits and Electronics (3 credits, qualifies with successful student petition after consultation with an Academic Advisor)

Students may choose to complete some electives on the Boulder campus (or remotely) by consulting the CU Boulder CSCI Upper Division Elective Course List.

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Senior Capstone
A two-semester senior capstone (beginning in fall and ending in spring) is required for 8 credit hours. This sequence must be taken contiguously and may not be taken before senior year. Prerequisites for a senior capstone include the successful completion of the college writing requirement (Western ENG 302), as well as the computer science foundation, core, and elective courses as listed in the plan of study, to reach a minimum of 36 computer science credit hours.

Grade Requirements
The minimum passing grade for prerequisite and co-requisite classes for computer science majors is a C-. This includes courses completed outside the program. A grade of C- or better is required in each Computer Science Foundation course, as well as in each course used to satisfy the Computer Science Core and the Computer Science Capstone. A grade of C- or higher is needed in all prerequisite courses to take a subsequent course. **The minimum passing grade for standalone classes is a D–.** Per CEAS Academic Expectations and Policies, if the minimum required grade in a prerequisite course is not achieved, the student is required to repeat the course until the minimum acceptable grade has been earned (maximum of 3 attempts total). If a student takes the advanced (post-requisite) course, it does not remove the obligation to meet the prerequisite course minimum grade requirement, even if the grade earned in the advanced course is acceptable. To remain in good academic standing, students must maintain a **cumulative CU Boulder GPA of 2.00.** In addition, students need to have a cumulative and **major GPA of at least 2.00** to graduate from the CU Boulder College of Engineering. Details specific to Computer Science can be found under Additional Policies and Requirements.

Taking Courses in Boulder or Remotely
Students considering taking main campus courses in Boulder (including remote courses) to fulfill degree requirements should be aware that these classes may incur additional student fees, since partnership students taking courses in Gunnison pay a reduced fee structure. Tuition discount programs (ex. Western Undergraduate Exchange and Central Plains) do not apply. Online classes (which are different than remote classes and usually offered through Continuing Education) generally do not incur the same additional fees but may incur additional Continuing Education Tuition.

Free Electives
College-level coursework accepted by CU Boulder not used otherwise to satisfy degree requirements. Computer science does allow courses counting as free electives to be taken on a pass/fail basis (however the college limits use to 6 per semester and 16 cumulative and students must first submit a petition prior to choosing this option). Use www.transferology.com to verify that courses will transfer to CU Boulder as appropriate equivalencies.

Coursework Not Accepted for Transfer Credit
All courses will undergo a transfer evaluation and the credit be transferred to CU Boulder as applicable. The following coursework will not be accepted for transfer credit and will not count toward a degree at CU Boulder, as described in the Campus Transfer Credit Policy:

- any courses in which the grade earned is below a C- (1.70)
- courses identified by CU Boulder as remedial, such as remedial English, mathematics, science and developmental reading
- vocational-technical courses that are offered at two-year and proprietary institutions (exceptions may be granted only by the CU Boulder dean responsible for the student's curriculum)

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- courses in religion that constitute specialized religious training or that are doctrinal in nature
- credits earned for work experience or through a cooperative education program
- outdoor leadership education coursework
- credits earned in physical education activity courses
- courses or programs identified as college orientation

Credit hours required for graduation that were earned more than ten years prior to transferring into an undergraduate degree program at CU Boulder may not apply to the completion of a student's graduation requirements.

Students are responsible for making up any difference in credit hours between the transfer credit received and the CU Boulder course. This can happen when students transfer in coursework from an institution on a quarter-system, for example. Furthermore, students must have their Academic Advisor approve how the credit shortfall is made up (based on ABET and other departmental requirements). Students need to have a minimum of 128 unique non-duplicative, degree applicable credit hours, along with meeting the specified course and other requirements for a specific bachelor's degree program per CEAS Transfer Credit Policy.

Academic Standing
To remain in good academic standing with the College of Engineering and Applied Science, a student must maintain satisfactory academic performance as measured by GPA and progress toward completion of a Bachelor of Science degree. Failure to meet these requirements (including the 2.00 GPA) results in the student being placed on Academic Alert, Academic Recovery, and/or Academic Suspension. Students in this situation should consult their Academic Advisor and review the Academic Standing Policies.

Academic Calendar
Western partnership students adhere to the same calendar as Western students (for holiday breaks, etc.). However, add, drop and withdrawal dates for coursework may differ and can be found on the CU Boulder Registrar's Website.

Petition Process
Students seeking an exception to a policy or practice (including transfer coursework policies) should first talk to their Academic Advisor and then submit a petition.

Internship for Credit
Students may receive up to 3 credits of free electives (COEN 3930) for an internship or co-op experience. Students must secure the position prior to completing the application, and have (as well as maintain) a 2.00 GPA. All internships for credit must be full-time (40 hours per week) and a minimum of 300 contact hours are required to receive the 3 credits of free elective. Students can apply online and questions can be directed to their Academic Advisor or Sharon Anderson (CEAS Director of Active Learning).

WESTERN COLORADO UNIVERSITY

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RECOMMENDED SEQUENCE OF COURSEWORK

Students are responsible for knowing and adhering to course prerequisites as listed in the course catalog. Certain courses may only be offered during the fall or spring semester. Western coursework is in red font, while CU Boulder coursework is in black font.

First Year

	FALL SEMESTER			SPRING SEMESTER	
CS 190	Computer Science I (free elective)	3	CS 191	Computer Science II	3
MATH 151	Calculus I	4	MATH 251	Calculus II	4
PHYS 190	General Physics I w/ lab	3		Natural Science Sequence (PHYS 191 + 186 preferred)	4
PHYS 185	Laboratory Physics I	1			
ENG 102	Academic Writing (free elective)	3	PHIL 100 or	Critical Thinking	
HWTR 100	CS-based Headwaters	1	PHIL 200	Symbolic Logic	3
	H&SS Elective (Lower-Division)	3		H&SS Elective (Lower-Division)	3
	TOTAL Semester hours	18		TOTAL Semester hours	17

Sophomore Year

	FALL SEMESTER			SPRING SEMESTER	
CS 280	Data Structures	3	CS 370	Systems Programming in C	3
CS 330	Operating Systems and Architecture	3	CS 412	Software Engineering	3
MATH 314	Applied Probability	3	MATH 200	Discrete Mathematics	3
	Natural Science	3	PHIL 135	Introduction to Ethics	3
	H&SS Elective (Lower-Division)	3		Free Elective	3
	TOTAL Semester hours	15		TOTAL Semester hours	15

Junior Year

	FALL SEMESTER			SPRING SEMESTER	
CSCI 2820	Linear Algebra with CS Applications	3	CSCI 3155	Principles of Programming Languages	4
CSCI 3104	Algorithms	4		CSCI Core/Elective	4
	CSCI Core/Elective	3		CSCI Core/Elective	3
	CSCI Core/Elective	3	ENG 302	Technical Writing	3
	Natural Science	3			
	TOTAL Semester hours	16		TOTAL Semester hours	14

Senior Year

	FALL SEMESTER			SPRING SEMESTER	
CSCI 4308	Software Engineering Project I	4	CSCI 4318	Software Engineering Project II	4
	CSCI Core/Elective	4		CSCI Core/Elective	3
	CSCI Core/Elective	3		CSCI Core/Elective	3
	Natural Science	3		H&SS Elective (Upper-Division)	3
	H&SS Elective (Upper-Division)	3		Free Elective	3
	TOTAL Semester hours	17		TOTAL Semester hours	16

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