

# COMPUTER SCIENCE, COMPREHENSIVE MAJOR

## Liberal Arts (Code 170-030)

### University Requirements

#### GRADUATION REQUIREMENTS FOR BACCALAUREATE DEGREE

##### Credit Requirements

Minimum total for graduation <sup>1</sup>	120
Upper division credits (courses numbered 300 and higher)	39
Liberal Education Core ( <a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header1">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header1</a> )	36
Academic Concentrations ( <a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header16">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header16</a> )	

##### Grade Point Requirements (<http://catalog.uwec.edu/undergraduate/graduation-requirements/#header14>) <sup>2</sup>

Total	2.00 average
Resident	2.00 average
Major	2.00 average
Minor	2.00 average
Certificate	2.00 average

##### University Residency Requirements (<http://catalog.uwec.edu/undergraduate/graduation-requirements/#header15>)

Minimum total	30
Senior year	23
Major, Standard, upper division in residence	12
Major, Comprehensive, upper division in residence	21
Certificate	25 percent of credits

##### Procedures Required for Graduation

Obtain admission to the degree program and/or the College offering it.

Apply for graduation on Camp5.

<sup>1</sup> Certain programs exceed this minimum.

<sup>2</sup> See special requirements in each College.

### Applicability of Credits Toward Graduation

**Junior College or Two-Year College Credits.** A maximum of 72 semester credits earned in a junior college or two-year college will be accepted as degree credits at UW-Eau Claire.

**Extension Credits.** Credits earned in credit outreach courses offered by UW-Eau Claire are treated as resident credits. Credits earned in extension courses offered by other units of the Universities of Wisconsin System are treated as transfer credits. All other (non-UW) extension and correspondence credits are normally limited to one-fourth of the total required for graduation from any curriculum.

**WTCS Credits.** A maximum of 72 semester credits earned in college parallel programs at Madison Area Technical College, Milwaukee Area Technical College, Nicolet Area Technical College, or Chippewa Valley Technical College may be accepted as degree credits at UW-Eau Claire. A set number

of general education courses will be accepted from other technical schools. Occupational and technical courses may also be considered for transfer if the quality and content of the course work from the technical college is judged to be comparable to course work at UW-Eau Claire. Refer to the Transfer Credit Wizard ([https://my.uwec.edu/psp/PUBLIC/EMPLOYEE/HRMS/c/EAU\\_SS\\_CUSTOM.EAU\\_TRNCRDWZ.GBL](https://my.uwec.edu/psp/PUBLIC/EMPLOYEE/HRMS/c/EAU_SS_CUSTOM.EAU_TRNCRDWZ.GBL)) or contact the UW-Eau Claire Admissions Office for information about the current transfer policy.

**USAFI Credit.** UW-Eau Claire will accept up to 32 semester credits for work done through the United States Armed Forces Institute, under the provision for non-UW correspondence credit (see Extension Credits above).

**Activity Credit (band, chorus, drama, KINS 100-184 courses)** Students may count toward graduation no more than one credit of KINS 110-184 courses. Students may count toward graduation no more than four credits earned in any single activity course and no more than 12 credits resulting from any combination of activity courses (excluding KINS 110-184 courses).

**Other Restricted Credits.** For other University restrictions, see the following: Cooperative Education; Credit by Examination; Satisfactory/Unsatisfactory Registration; Transfer of Credits. College or departmental restrictions may also be placed on Independent Study (399-499 courses), Directed Study (395-495), and other types of credits.

### APPLICABILITY OF CREDITS TOWARD GRADUATION

#### Credit Restrictions

##### Satisfactory/Unsatisfactory

Total degree credit	maximum 12
Major, Standard	maximum 1 course
Major, Comprehensive	maximum 2 courses
Minor	maximum 1 course

##### Credit by Examination

Total degree credit	maximum ¼ of total
Major or minor	maximum ½ of total

##### Two-Year College Credits

Total degree credit	maximum 72 credits
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##### Activity credit (band, chorus, drama, KINS 100-184)

Total KINS 100-184	maximum 1 credit
Total Band, chorus, drama	maximum 12 credits
Single course band, chorus, drama	maximum 4 credits

##### Extension credits

UW-System	no maximum
Other extension/correspondence	maximum ¼ of total

##### USAFI

USAFI	maximum 32 credits
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Liberal Education Core

The University of Wisconsin-Eau Claire measures learning outcomes to ensure that its graduates have achieved a liberal education and prepared themselves to contribute to a complex society. Upon graduation, each undergraduate will have met the five learning goals of our liberal education core and the 12 learning outcomes they comprise.

<b>LIBERAL EDUCATION CORE REQUIREMENTS</b>		<b>a minimum of 36 credits</b>
<b>Knowledge Goal</b>		
Knowledge Outcome 1 (K1): Natural Sciences ( <a href="http://catalog.uwec.edu/undergraduate/attribute-k1/">http://catalog.uwec.edu/undergraduate/attribute-k1/</a> )	Two (2)	learning experiences
One experience in laboratory science must be selected from either K1 or K2.		
Knowledge Outcome 2 (K2): Social Sciences ( <a href="http://catalog.uwec.edu/undergraduate/attribute-k2/">http://catalog.uwec.edu/undergraduate/attribute-k2/</a> )	Two (2)	learning experiences
One experience in laboratory science must be selected from either K1 or K2.		
Knowledge Outcome 3 (K3): Humanities ( <a href="http://catalog.uwec.edu/undergraduate/attribute-k3/">http://catalog.uwec.edu/undergraduate/attribute-k3/</a> )	Two (2)	learning experiences
Knowledge Outcome 4 (K4): Fine Arts ( <a href="http://catalog.uwec.edu/undergraduate/attribute-k4/">http://catalog.uwec.edu/undergraduate/attribute-k4/</a> )	One (1)	learning experience
<b>Skills Goal</b>		
Skills Outcome 1 (S1): Written and Oral Communication ( <a href="http://catalog.uwec.edu/undergraduate/attribute-S1/">http://catalog.uwec.edu/undergraduate/attribute-S1/</a> )	Two (2)	learning experiences
One S1 must meet the University Writing Requirement ( <a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header10">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header10</a> )		
Skills Outcome 2 (S2): Mathematics ( <a href="http://catalog.uwec.edu/undergraduate/attribute-S2/">http://catalog.uwec.edu/undergraduate/attribute-S2/</a> )	One (1)	learning experience
One S2 to meet the University Mathematics Requirement ( <a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header11">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header11</a> )		
Skills Outcome 3 (S3): Creativity ( <a href="http://catalog.uwec.edu/undergraduate/attribute-S3/">http://catalog.uwec.edu/undergraduate/attribute-S3/</a> )	One (1)	learning experience
<b>Responsibility Goal</b>		
Responsibility Outcome 1 (R1): Equity, Diversity, and Inclusivity ( <a href="http://catalog.uwec.edu/undergraduate/attribute-R1/">http://catalog.uwec.edu/undergraduate/attribute-R1/</a> )	Two (2)	learning experiences
One R1 must satisfy Design for Diversity ( <a href="http://catalog.uwec.edu/undergraduate/attribute-DDIV/#header13">http://catalog.uwec.edu/undergraduate/attribute-DDIV/#header13</a> )		
Responsibility Outcome 2 (R2): Global Perspectives ( <a href="http://catalog.uwec.edu/undergraduate/attribute-R2/">http://catalog.uwec.edu/undergraduate/attribute-R2/</a> )	One (1)	learning experience
Responsibility Outcome 3 (R3): Civic and Environmental Issues ( <a href="http://catalog.uwec.edu/undergraduate/attribute-R3/">http://catalog.uwec.edu/undergraduate/attribute-R3/</a> )	One (1)	learning experience
<b>Integration Goal</b>		
Integration Outcome 1 (I1): Integration ( <a href="http://catalog.uwec.edu/undergraduate/attribute-I1/">http://catalog.uwec.edu/undergraduate/attribute-I1/</a> )	Two (2)	learning experiences

### Community-Engaged Learning Goal

Community-Engaged Learning (<http://catalog.uwec.edu/undergraduate/attribute-cel/#header13>)

College Degree Requirements

Bachelor of Arts or Bachelor of Science Degree (B.A./B.S.)

**University Graduation Requirements.** All candidates for degrees must fulfill the requirements for credits, curriculum, GPA, and University residency as specified in the section of this catalog titled University Graduation Requirements (<http://catalog.uwec.edu/undergraduate/graduation-requirements/>).

**College Graduation Requirements: Grade Point Averages.** All candidates for degrees in the College of Arts and Sciences must earn minimum resident and total GPAs of 2.00 in the major, the minor, and the certificate. The resident and total GPAs for the major are computed using all attempted credits applicable to the major including those offered by departments other than the major department. The resident and total GPAs for the minor and the certificate are computed similarly.

**Major-Minor and Major-Certificate Requirements.** A standard major (a minimum of 36 credits) must be supplemented by a minor (a minimum of 24 credits) or by a certificate (12 to 18 credits) to meet graduation requirements for completing a first and second degree program. No minor or certificate is required with a Comprehensive Major (60 or more credits) or with two majors of 36 or more credits each.

Certain degree programs, which include Comprehensive Majors, may require more than the minimum of 120 credits for graduation.

Acceptable academic program combinations are determined at the college level. A major and a minor or a major and certificate or two majors (if available) may not be elected in the same department or program, except in the approved combinations listed here (<http://catalog.uwec.edu/undergraduate/arts-sciences/#academicprogramtext>).

**College Credits.** Earn at least 90 credits in courses offered by the College of Arts and Sciences.

Bachelor of Arts Degree in the College of Arts and Sciences (B.A.)

Fulfillment of all University Graduation Requirements (which includes the Liberal Education Core); all College-level degree requirements (major and minor/certificate emphases, GPAs, earning at least 90 credits in Arts and Sciences course work); second language competency at the 102 level. Second language competency may be met in one of two ways: (1) Demonstrate a level of second language competency that qualifies the student to enter the 201-level course in a second language. (2) Earn a grade of at least C (not C-) or a mark of S in a 102-level second language course (or AIS 112 or AIS 122 or SLHS 103).

Bachelor of Science Degree in the College of Arts and Sciences (B.S.)

Fulfillment of all University Graduation Requirements (which includes the Liberal Education Core); all College-level degree requirements (major and minor/certificate emphases, GPAs, earning at least 90 credits in Arts and Sciences course work); mathematics competency at the MATH 111, MATH 112 or MATH 113 level. Mathematics competency can be met in one of three ways:

(1) Achieve a score on the mathematics placement test that qualifies the student to enter MATH 114. (2) Earn a grade of at least C (not C-) or a mark of S in MATH 111, MATH 112, or MATH 113. (3) Achieve a satisfactory score on the

MATH 112 competency test. This test may be attempted no more than two times.

Major Requirements

Liberal Arts (Code 170-030)

This major is recommended for students who desire a strong foundation in software design and development, computer systems and networking, and mathematics.

Code	Title	Credits
A minimum of sixty semester credits, including:		
<b>Computer Science core (34 crs)</b>		
CS 140	Introduction to Computer Science	4
CS 150	Object-Oriented Programming	4
CS 255	Data Structures and Algorithms	4
CS 262	Database Systems	3
CS 268	Web Systems	3
CS 285	Computer Organization	4
CS 355	Software Engineering I	3
CS 452	Operating Systems	3
CS 462	Computer Networks	3
CS 497	Capstone Project (capstone course)	3
<b>Mathematics Core (15 crs)</b>		
MATH 114	Calculus I	4
MATH 215	Calculus II	4
MATH 314	Discrete Mathematics	3
MATH 246 or MATH 345	Elementary Statistics Introduction to Probability and Mathematical Statistics	4
<b>Electives: 12 credits with at least 9 credits earned from courses at the 300-level or above</b>		
AI 250	Foundations of Artificial Intelligence	
AI 350	Human-Computer Interaction	
AI 420	Artificial Intelligence	
CS 291	Special Topics	
CS 330	Programming Languages	
CS 370	Computer Security	
CS 376	Cryptography and Network Security	
CS 388	UNIX Systems Programming	
CS 399	Independent Study - Juniors	
CS 425	Machine Learning	
CS 426	Deep Learning	
CS 436	Mobile Software Development	
CS 450	Theory of Computation	
CS 455	Computer Graphics	
CS 485	Software Engineering II	
CS 491	Special Topics	
CS 498	Computer Science Internship	
Or other courses designated by the department (six-seven credits; recommended for students considering industry employment)		

For a major in Computer Science, a student must complete:

Code	Title	Credits
<b>Required courses not counted toward credits in major:</b>		
Complete one of the following:		3
CJ 202	Fundamentals of Speech	
ENGL 312	Science Writing	
ENGL 313	Technical Writing	
Complete one lab science sequence chosen from:		9-10
PHYS 211 & PHYS 212	General Physics and General Physics	
OR		
PHYS 231 & PHYS 232	University Physics I and University Physics II	

Program Learning Outcomes

- Students completing this program will be expected to meet the following learning outcomes:
- Apply the foundational elements of mathematics, logic, critical thinking and problem-solving skills to develop the algorithms and data structures necessary to solve a wide variety of computing problems.
  - Analyze a problem, identify and define the computing requirements appropriate to its solution and demonstrate comprehension of the tradeoffs involved in design choices.
  - Design, implement and evaluate a computing system or component to meet desired needs.
  - Apply and use concepts from computer architecture and operating systems in computing system design, implementation and performance analysis.
  - Use and evaluate a wide variety of modern tools and languages used in the practical construction of computing systems.
  - Collaborate effectively in a team environment.
  - Recognize social, ethical, and legal issues that surround the production and use of technology.
  - Communicate effectively, both orally and in writing, to technical and non-technical audiences.