

Accelerated Graduate Program in CS: Cybersecurity (BS) and Software Engineering (MSE)

The Accelerated Graduate Program in Computer Science: Cybersecurity Emphasis and Software Engineering is a great opportunity to those highly motivated students who would like to further their knowledge in software engineering. This program enables students to complete both degrees, a Bachelor of Science (BS) in computer science and a Master of Software Engineering (MSE) from UW-La Crosse, with less time in school, less tuition, and enter the workforce earlier than those receiving traditional degrees. This program can be completed in five years compared to what typically would take six years when completing both degrees separately.

Students may be accepted into the accelerated graduate program anytime before they have completed seventy-five undergraduate credits hours. Applicants for undergraduate admission to UWL may request admission into the accelerated graduate program. In order to remain in the program students must maintain a 3.00 GPA. Award of the BS degree will occur upon completion of 120 credits, the CS major requirements, the CSH college requirements, and the general university requirements. Students must have graduate student status prior to registering for their fourth graduate course (normally in the second semester of their 4th year.) Award of the MSE degree will occur after the completion of the BS and MSE requirements.

Refer to the sample degree plan (p. 4) for course sequencing. Students should consult with the CS Department Chair or their CS faculty advisor for specific course advising for this agreement.

Major requirements

The Accelerated Graduate Program in Computer Science: Cybersecurity Emphasis and Software Engineering enables a UWL student to earn both a Bachelor of Science (B.S.) degree with a computer science major and a Master of Software Engineering (MSE) degree in five years.

Admission to the program

1. Students may declare the accelerated graduate program at any time. Declaring the accelerated graduate program does not guarantee admission into the graduate program.
2. Graduate courses cannot be taken until the student has completed 75 undergraduate credits.
3. Students must have and maintain a minimum UWL resident cumulative undergraduate GPA of 2.85/4.00; and maintain a cumulative graduate GPA of 3.00/4.00.

Curriculum

45 undergraduate credits; 30 graduate credits

Computer science major core

Code	Title	Credits
CPE 105	Introduction to the Computing Environment	1
CS 120	Software Design I	4
CS 220	Software Design II	4
CS 225	Discrete Computational Structures ¹	4
CS 270	Introduction to Assembler Programming, C Programming and Computer Organization	3
CS 340	Software Design III: Abstract Data Types	4
CS 364	Introduction to Database Management Systems	3
CS 370	Computer Architecture	3
CS 421	Programming Language Concepts	3
CS 441	Operating System Concepts	3
CS 442	Structures of Compilers	3
MTH 207	Calculus I	4
Total Credits		39

¹ May substitute MTH 225 for CS 225.

Master of Software Engineering core

Code	Title	Credits
CS 540	Software Design IV: Software Engineering	3
CS 555	Fundamentals of Information Security	3
CS 744	Software Project Management	3
CS 745	Software Modeling, Analysis, and Verification	3
CS 798	Software Development Project (taken twice)	12
Total Credits		24

Additional requirements (12 credits)

Code	Title	Credits
Cybersecurity emphasis		
CS 356	Software Exploitation	3
Select three credits of undergraduate electives.		3
Cybersecurity emphasis & Master of Software Engineering		
CS 556	Secure Software Development	3
Master of Software Engineering		
Select three additional credits of graduate CS electives.		3
Total Credits		12

Computer science major electives

Code	Title	Credits
CS 202	Introduction to Web Design	3
CS 224	Introduction to Programming Language	1-3
CS 227	Competitive Programming	1
CS 342	Software Testing Techniques	3
CS 351	Simulation	3
CS 353	Analysis of Algorithm Complexity	3
CS 356	Software Exploitation	3
CS 372	Hardware/Software Integration	3
CS 395	Independent Study	1-3
CS 402	Web Application Development	3
CS 410	Free and Open Source Software Development	3
CS 418	Mobile Application Development	3

CS 419	Topics in Computer Science	1-3	CS 555	Fundamentals of Information Security	3
CS 431	Introduction to Robotics	3	CS 556	Secure Software Development	3
CS 443	Topics in Operating Systems	3	CS 557	Machine Learning	3
CS 449	Advances in Software Engineering	3	CS 561	Introduction to Data Science	3
CS 451	User Interface Design	3	CS 564	Advanced Database Management Systems	3
CS 452	Artificial Intelligence	3	CS 570	Parallel and Distributed Computing	3
CS 453	Introduction to Theory of Computation	3	CS 571	Computer Networks	3
CS 454	Digital Image Processing	3	CS 572	Internet of Things	3
CS 455	Fundamentals of Information Security	3	CS 575	Computer Graphics and Modeling	3
CS 456	Secure Software Development	3	CS 576	Data Visualization	3
CS 457	Machine Learning	3	CS 750	Topics in Software Engineering	1-3
CS 461	Introduction to Data Science	3	CS 751	Seminar in Software Engineering	1-3
CS 464	Advanced Database Management Systems	3	CS 752	Independent Study	1-3
CS 470	Parallel and Distributed Computing	3			
CS 471	Computer Networks	3			
CS 472	Internet of Things	3			
CS 475	Computer Graphics and Modeling	3			
CS 476	Data Visualization	3			
CS 499	Research in Computer Science	1-3			
CPE 212	Digital Logic	3			
CPE 227	Introduction to Prototyping	1			
CPE 301	Introduction to Transient Analysis	3			
CPE 302	Introduction to Control Systems	3			
CPE 309	Systems Development	3			
CPE 321	Introduction to Digital Signal Processing	3			
CPE 395	Independent Study	1-3			
CPE 406	Architecture of Parallel Systems	3			
CPE 419	Topics in Computer Engineering	1-3			
CPE 420	Digital Design	3			
CPE 446	ASIC Design	3			
CPE 463	Advanced Computer Architecture	3			
CPE 466	Code Generation and Optimization	3			
CPE 478	Virtual Machines	3			
CPE 483	Engineering Project Management	1			
CPE 499	Research in Computer Engineering	1-3			
MTH 317	Graph Theory	3			
MTH 371	Scientific Computing and Numerical Methods	4			

Master of Software Engineering electives

Code	Title	Credits
CS 502	Web Application Development	3
CS 510	Free and Open Source Software Development	3
CS 518	Mobile Application Development	3
CS 519	Topics in Computer Science	1-3
CS 521	Programming Language Concepts	3
CS 531	Introduction to Robotics	3
CS 541	Operating System Concepts	3
CS 542	Structures of Compilers	3
CS 543	Topics in Operating Systems	3
CS 549	Advances in Software Engineering	3
CS 551	User Interface Design	3
CS 552	Artificial Intelligence	3
CS 553	Introduction to Theory of Computation	3
CS 554	Digital Image Processing	3

CS 540, CS 555, and CS 556 count toward both the undergraduate B.S. degree and the Master of Software Engineering degree.

Students may be accepted into the accelerated graduate program anytime before they have completed 75 undergraduate credit hours. Applicants for undergraduate admission to UWL may request admission into the accelerated graduate program. In order to remain in the program students must maintain a 3.00 GPA. Award of the B.S. degree will occur upon completion of 120 credits, 40 credits of 300/400 level coursework, the CS major requirements, the CSH college core requirements, and the general university requirements. Students must have graduate student status before registering for their fourth graduate course (normally in the second semester of their senior year). Award of the MSE degree will occur after the completion of the B.S. and MSE requirements.

Every student must complete the computer science major field test. This test is used for program assessment not individual assessment.

Contact the Department of Computer Science & Computer Engineering (<http://www.cs.uwlax.edu/>) for application information. See the online graduate catalog for more information about the MSE program (<https://catalog.uwlax.edu/graduate/programrequirements/softwareengineering/>).

Slash courses (400/500 level) offered at both the undergraduate(400) and graduate (500) levels can only be taken for credit at one level.

Degree requirements

All students must complete the general education, college core, major/minor, and university degree requirements to qualify for a degree. All enrolled students have access to a degree audit to track all of these requirements.

- Core general education requirements (<https://catalog.uwlax.edu/undergraduate/generaleducation/>)
- College core (p. 2)
- Baccalaureate degree requirements (p. 3)
- Master of Software Engineering requirements (<https://catalog.uwlax.edu/graduate/programrequirements/softwareengineering/mse/>)

College of Science and Health (CSH) Bachelor of Science core requirements

B.S. students graduating from the College of Science & Health are required to take:

1. Two MTH/STAT courses or one MTH/STAT course and one CS course

Code	Title	Credits
CS 101	Introduction to Computing ¹	
CS 115	Introduction to Python Programming ¹	
CS 120	Software Design I ¹	
CT 100	Introduction to Computational Thinking ¹	
MTH 115	Mathematics for Early Childhood and Elementary Teachers I ¹	
MTH 116	Mathematics for Early Childhood and Elementary Teachers II ¹	
MTH 123	Mathematics for Decision Making ¹	
MTH 150	College Algebra ¹	
MTH 151	Precalculus ¹	
MTH 160	Mathematics for Business ¹	
MTH 175	Applied Calculus ¹	
MTH 207	Calculus I ¹	
MTH 208	Calculus II ¹	
MTH 215	Mathematics for Middle School Teachers I ¹	
MTH 216	Mathematics for Middle School Teachers II ¹	
MTH 265	Mathematical Models in Biology ¹	
STAT 145	Elementary Statistics ¹	

¹ Course may also satisfy a Core General Education Requirement.

2. Two laboratory science courses, one of the two courses must be from a department outside of the student's major department:

Code	Title	Credits
ANT 102	Introduction to Biological Anthropology ¹	
BIO 100	Biology for the Informed Citizen ¹	
BIO 105	General Biology ¹	
BIO 203	Organismal Biology	
BIO 210	Animal Biology	
BIO 304	Plant Biology	
CHM 103	General Chemistry I ¹	
CHM 104	General Chemistry II	
ESS 205	Human Anatomy and Physiology for Exercise and Sport Science I	
GEO 101	Earth Environments ¹	
GEO 221	Weather and Climate	
GEO 222	Earth Surface Processes and Landforms	
MIC 100	Microbes and Society ¹	
PHY 103	Fundamental Physics I ¹	
PHY 104	Fundamental Physics II	
PHY 106	Physical Science for Educators ¹	
PHY 155	Solar System Astronomy ¹	
PHY 160	Stars, Galaxies and the Universe ¹	
PHY 203	General Physics I ¹	
PHY 204	General Physics II	

Notes: Mathematics courses can be pairs, i.e. MTH 150 and MTH 151.

3. In addition to all other College of Science and Health core requirements, students from non-exempted programs² must complete one of the following options. It is recommended that

courses are selected in consultation with students' academic advisor.

- Complete a second major; or
- Complete a minor outside the major; or
- Complete two certificates outside the major with at least 12 combined credits at the 300/400 level; or
- Complete an individualized option, consisting of 18 credits
 - At least 12 credits must be earned at the 300/400 level outside the major department.
 - The remaining six credits should come from
 - 100 level or higher courses outside the major (all courses used to meet these requirements must be in addition to the minimum credits required in the Core General Education Requirements); or
 - 300/400 level courses inside major not being used to fulfill major requirements.
 - Internship credits may not count toward the individualized option.

² The list of exempted CSH programs is on the CSH catalog page (<https://catalog.uwlax.edu/undergraduate/scienceandhealth/#exemptions>).

Baccalaureate degree requirements

Candidates for the Bachelor of Arts or the Bachelor of Science degrees must accomplish the following:

- Fulfill the Core General Education Requirements (CGER) (<https://catalog.uwlax.edu/undergraduate/generaleducation/#generaleducationrequirements>).
- Complete the courses prescribed by the Undergraduate Curriculum Committee for the degree desired in the respective school or college.
- Earn a minimum of 120 semester credits with at least a 2.00 cumulative GPA.^{1,2}
- At least 40 credits must be earned in 300/400 level courses. Transfer courses earned or transferred at the 300/400 level apply to this requirement.
- Complete major and minor requirements with at least a 2.00 GPA¹,² in each major and minor (and concentration or emphasis, if selected).
- A minimum of 30 semester credits in residence at UWL is required for graduation. (See undergraduate resident requirement (<https://catalog.uwlax.edu/undergraduate/academicpolicies/graduation/#undergraduate-residence-requirement>)).
- Submit an application for graduation via the "Submit Intent to Graduate" link in the WINGS Student Center as soon as the student has registered for his or her final semester or summer term in residence. December and winter intersession graduates should apply by May 1. May and summer graduates should apply by December 1.

¹ Grade point average requirements for some programs will be considerably higher than 2.00. Re-entering students may be required to earn credits in excess of the 120 needed for graduation in any curriculum to replace credits earned in courses in which the content has changed substantially in recent years. Each case will be judged on its own merit.

² The grade point average recorded at the time the degree is awarded will not be affected by future enrollment.

No degree will be awarded unless all requirements are fulfilled and recorded within 30 days after the official ending date of each term.

Sample degree plan

Below is a sample degree plan that can be used as a guide to identify courses required to fulfill the major and other requirements needed for degree completion. A student's actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Also, this sample plan assumes readiness for each course and/or major plan, and some courses may not be offered every term. Review the course descriptions or the class timetable (<http://www.uwlax.edu/records/registration/>) for course offering information.

The sample degree plans represented in this catalog are intended for first-year students entering UWL in the fall term. Students should use their degree audit and work closely with their advisor(s) and college dean's office to ensure declaration and completion of all requirements in a timely manner.

Core General Education Program

The Core General Education Requirement (CGER) is the common educational experience for all undergraduates at UWL. Sample degree plans include CGER placeholders to ensure completion of the core general education requirements. The CGER category listed in parentheses indicated the recommended course to help complete CGER and the program requirements. Transferred courses may alter the plan. Courses may be rearranged to fit the needs or recommendations of the student's program of study. CGER courses may be taken during winter term (January between the semesters) and summer to reduce the course load during regular terms (fall and spring). Students should consult with their advisor and/or the college academic services director in their college/school for assistance with course and schedule planning. Refer to the Core General Education Requirements (<https://catalog.uwlax.edu/undergraduate/generaleducation/>) for more specific details.

At least 40 credits of the 120 credits required must be earned at the 300/400-level.

Note: New students and transfer students with less than 12 credits earned are required to take The Eagle Advantage for College Success (UWL 100, 2 cr.) or FYS 100 First-Year Seminar (3 cr.) during one of their first two semesters at UWL.

This sample degree plan does not establish a contractual agreement. It identifies the minimum requirements a student must successfully complete, to qualify for a degree, in a format intended to assist the student in planning their academic career. Actual degree plans may differ.

Year 1		
Fall	Credits Spring	Credits
CS 120 (CGER MQR-QR Mathematics & Quantitative Reasoning: Quantitative Reasoning (Depending on math placement exam results))	4 CS 220	4
CPE 105	1 CS 225 or MTH 225	4
MTH 207 (CSH Core)	4 CST 110 (CGER CL-SL Communication & Literacy: Spoken Literacy)	3
ENG 110 (CGER CL-WL Communication & Literacy: Written Literacy)	3 CGER NSW-MBP Natural Science & Wellness: Mind, Body, & Planet	3

UWL 100 or FYS 100 (CGER SBS-FS Social & Behavioral Science: Social Foundation for Success)	2 CGER CP-CW Civics & Perspective: Cultures of Our World	3
CGER HA-AA Humanities & Arts: Arts & Aesthetics	3	
17		17
Year 2		
Fall	Credits Spring	Credits
CS 270	3 CS 364	3
CS 340	4 CS 370	3
CGER NSWL-ES Natural Science & Wellness: Experiential Science	4 CS Elective	3
CSH Core (300/400 not CS) or Minor ¹	3 CGER HA-PDU Humanities & Arts: Pasts that Define Us	3
	CGER SBS-BS Social & Behavioral Science: Social & Behavioral Studies	3
14		15
Year 3		
Fall	Credits Spring	Credits
CS 356	3 CS 442	3
CS 421	3 CSH Core (300/400 not CS) or Minor ¹	3
CS 441	3 CSH Core (300/400 not CS) or Minor ¹	3
CSH Core (Lab Science)	4 University Elective	2
University Elective	3 CGER CP-CU Civics & Perspective: Communities of the United States	3
	University Elective	3
	Apply for "graduate special status" for Fall semester	
16		17
Year 4		
Fall	Credits Spring	Credits
CS 540	3 CS 555	3
CS 744	3 CS 556	3
CS 745	3 University Elective	3
University Elective	3 CGER CL-SWT Communication & Literacy: Stories We Tell	3
CSH Core (300/400 not CS) or Minor ¹	3 University Elective	3
Apply for "full graduate status" for Spring semester	Complete CS major field test ²	
15		15
Additional year		
Fall	Credits Spring	Credits
CS 798	6 CS 798	6
MSE Elective	3	
9		6

Total Credits: 141

¹ See CSH BS Core Requirements (<https://catalog.uwlax.edu/undergraduate/scienceandhealth/#bs-core>) for information on completing the individualized option. 300/400 requirements for graduation may be impacted.

² Every student must complete the computer science major field test during their senior year. This test is used for program assessment, not individual assessment.

Students also have the option of taking CGER courses during Winter Interession (January between Fall and Spring semesters) and Summer to reduce the load during regular semesters (Fall and Spring).

Additional UWL and College of Science and Health core courses may be required.