COMPUTER SCIENCE MAJOR, BACHELOR OF SCIENCE (BS)

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

The traditional computer science degree provides extensive preparation in both the theoretical and practical aspects of computer science. It prepares students for a variety of careers in computing or for additional study at the graduate level. In this program, students study both general purpose programming and programming for specialized purposes and environments. In addition, students learn about algorithms, performance analysis, networks, computer architectures, information systems, and software engineering. Students also work on a realistic project in a team environment. The program includes a variety of advanced courses that allow students to tailor their degree to their specific interests.

Exam Requirement: All Computer Science majors are required to pass the Advanced Programming Exam prior to taking courses for which it is a prerequisite. Passing the exam is required for graduation and no exam waivers will be granted for degree completion.

Note: no course may be used as both a requirement and an elective in a student's program.

Grade Requirements: As a computer science student, you are expected to maintain an overall university GPA ≥2.3. Each computer science course must be completed with a minimum grade ≥C+. All supporting courses required by the department must be completed with a minimum grade ≥C.

Required Computer Science Courses		
CYBR 101	CYBERSECURITY FUNDAMENTALS	5
CSCD 202	COMPUTING ETHICS	4
CSCD 210	PROGRAMMING PRINCIPLES I	5
CSCD 211	PROGRAMMING PRINCIPLES II	5
CSCD 212	OBJECT ORIENTED PROGRAMMING WITH DESIGN PATTERNS	5
CSCD 240	C AND UNIX PROGRAMMING	5
CSCD 260	ARCHITECTURE AND ORGANIZATION	4
or EENG 260	MICROCONTROLLER SYSTEMS	
CSCD 300	DATA STRUCTURES	5
CSCD 320	ALGORITHMS	5
CSCD 327	RELATIONAL DATABASE SYSTEMS	4
CSCD 330	COMPUTER NETWORKS	4
CSCD 340	OPERATING SYSTEMS	5
CSCD 350	SOFTWARE DEVELOPMENT PRINCIPLES	4
CSCD 420	COMPILERS	4
Required Supporting Courses		
EENG 160	DIGITAL CIRCUITS	5
MATH/HONS 161	CALCULUS I	5
MATH 162	CALCULUS II	5
MATH 231	LINEAR ALGEBRA	5
MATH 301	DISCRETE MATHEMATICS	5
MATH 380	ELEMENTARY PROBABILITY AND STATISTICS	5
Required Laboratory Science Sequence—choose one sequence from the following		**10-15**
Biology		
BIOL 171	BIOLOGY I	
BIOL 172	BIOLOGY II	
BIOL 270	BIOLOGICAL INVESTIGATION	
Chemistry		
CHEM 171	GENERAL CHEMISTRY I	
& 171L	and GENERAL CHEMISTRY LABORATORY I	
& CHEM 172	and GENERAL CHEMISTRY II	
& CHEM 172L	and GENERAL CHEMISTRY LABORATORY II	
Geosciences		
GEOS 100	DISCOVERING GEOLOGY	
GEOS 113	THE EARTH'S CLIMATE AND WEATHER	
Physics		

PHYS 151	GENERAL PHYSICS I	
PHYS 152	GENERAL PHYSICS II	
PHYS 161	MECHANICS LABORATORY	
PHYS 162	HEAT AND OPTICS LABORATORY	
Required Electives—choose six courses; at least four courses must be 400-level		**24**
Note: many of these elective courses have prerequisites.		
Note: other courses may be used with prior approval of the department.		
CSCD 303	COMPUTER AND INFORMATION SECURITY	
CSCD 305	C++ PROGRAMMING	
CSCD 316	PRACTICAL PROBLEM SOLVING	
CSCD 370	GUI PROGRAMMING	
CSCD 371	.NET PROGRAMMING	
CSCD 372	ANDROID MOBILE DEVELOPMENT	
CSCD 373	IOS MOBILE DEVELOPMENT	
CSCD 377	INTRODUCTORY COMPUTER GRAPHICS	
CSCD 378	WEB APPLICATION DEVELOPMENT	
CSCD 379	.NET WEB APPLICATION DEVELOPMENT	
CSCD 396	EXPERIMENTAL COURSE (prior departmental approval of topic content is required)	
CSCD 398	SEMINAR (prior departmental approval of topic content is required)	
CSCD 399	DIRECTED STUDY (prior departmental approval of topic content is required)	
CSCD 409	SCIENTIFIC PROGRAMMING	
CSCD 423	RANDOMIZED ALGORITHMS AND PROBABILISTIC ANALYSIS	
CSCD 427	ADVANCED DATABASE MANAGEMENT SYSTEMS	
CSCD 429	DATA MINING	
CSCD 430	BIG DATA ANALYTICS	
CSCD 433	ADVANCED NETWORKING CONCEPTS	
CSCD 434	NETWORK SECURITY	
CSCD 435	PRINCIPLES OF PROGRAMMING LANGUAGE	
CSCD 437	SECURE CODING	
CSCD 439	TOPICS IN COMPUTER SCIENCE (prior departmental approval of topic content is required)	
CSCD 443	DISTRIBUTED MULTIPROCESSING	
CSCD 445	GPU COMPUTING	
CSCD 460	ADVANCED ARCHITECTURE AND ORGANIZATION	
or EENG 460	COMPUTING SYSTEMS: ORGANIZATION AND DESIGN	
CSCD 461	EMBEDDED SYSTEMS	
or EENG 461	EMBEDDED SYSTEMS DESIGN	
CSCD 462	EMBEDDED REAL-TIME CONTROL	
or EENG 462	REAL TIME EMBEDDED SYSTEMS	
CSCD 467	PARALLEL AND CLOUD COMPUTING	
CSCD 470	3D COMPUTER GRAPHICS PRINCIPLES	
CSCD 471	ADVANCED 3D COMPUTER GRAPHICS	
CSCD 477	VIRTUAL REALITY WITH COMPUTER GRAPHICS AND GAME ENGINES	
CSCD 480	INTELLIGENT SYSTEMS	
CSCD 483	MODELING AND SIMULATION	
CSCD 484	MACHINE LEARNING	
CSCD 485	DEEP LEARNING	
CSCD 487	HUMAN COMPUTER INTERFACE	
CSCD 495	INTERNSHIP (variable credit—up to two 4 credit internships are allowed)	
CSCD 496	EXPERIMENTAL COURSE (variable credit—prior departmental approval of topic content is required)	
CSCD 498	SEMINAR (variable credit—may be repeated)	
CSCD 499	DIRECTED STUDY (variable credit—prior departmental approval of topic content is required)	
CYBR 403	CYBERSECURITY POLICIES, PRIVACY AND LAWS	

CYBR 410	APPLIED CYBER DEFENSE	
CYBR 412	APPLIED CYBER OPERATIONS	
CYBR 455	DIGITAL FORENSICS AND CYBERCRIME	
Required Senior Capstone Series		
CSCD 488	SENIOR PROJECT	5
CSCD 490	SENIOR CAPSTONE	5
Total Credits		**138-143**

Plan of Study

The following plan of study is for a student with zero credits. Individual students may have different factors such as: credit through transfer work, Advanced Placement, Running Start, or any other type of college-level coursework that requires an individual plan.

Courses may be offered in different terms and not all courses are offered every term, checking the academic schedule is paramount in keeping an individual plan current. There may be some courses that have required prerequisites not listed in the plan, review the course descriptions for information. **Students should connect with an advisor to ensure they are on track to graduate.**

All Undergraduate students are required to meet the Undergraduate Degree Requirements (http://catalog.ewu.edu/undergraduate-degree/).

First Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
EENG 160	5	CYBR 101 (Social Science BACR 1)	5	CSCD 202 (Humanities & Arts BACR 1)	4
ENGL 101	5	MATH 161	5	ENGL 201	5
Natural Science BACR 1 (Laboratory Science Sequence)[1]	5	Natural Science BACR 2 (Laboratory Science Sequence)[1]	5	Social Science BACR 2[1]	5
	15		**15**		**14**

Second Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
CSCD 210	5	CSCD 211	5	CSCD 212	5
MATH 380	5	CSCD 240	5	CSCD 300	5
Humanities & Arts BACR 2[1]	5	MATH 162	5	MATH 301	5
	15		**15**		**15**

Third Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
CSCD 260 or EENG 260	4	CSCD 320	5	CSCD 327	4
CSCD 303	4	CSCD 420	4	CSCD 340	5
CSCD 330	4	MATH 231	5	Computer Science Elective[2]	4
Global Studies - graduation requirement[1]	5	Computer Science Elective[2]	4	Elective - certificate, minor, or general elective	4
	17		**18**		**17**

Fourth Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
CSCD 350	4	CSCD 488	5	CSCD 490 (Senior Capstone - graduation requirement)	5
CSCD 378	4	Computer Science Elective[2]	4	Computer Science Elective[2]	4
Computer Science Elective[2]	4	Computer Science Elective[2]	4	Diversity - graduation requirement[1]	5
	12		**13**		**14**

Total Credits 180

[1] University Graduation Requirements (UGR) and Breadth Area Course Requirements (BACR) courses may be less than 5 credits and additional credits may be required to reach the required 180 total credits needed to graduate. Students should connect with an advisor to ensure they are on track to graduate.

[2] Required Electives—choose six courses from the approved list; at least four courses must be 400-level. Many of the elective courses have prerequisites. Other courses may be used with prior approval of the department.

University Competencies and Proficiencies

English (http://catalog.ewu.edu/undergraduate-degree/#newitemtext)

Quantitative and Symbolic Reasoning (http://catalog.ewu.edu/undergraduate-degree/#mathcompproficienciestext)

Placement and Clearance (http://catalog.ewu.edu/placement/)

Prior Learning/Sources of Credit AP, CLEP, IB (http://catalog.ewu.edu/prior-learning/)

General Education Requirements (http://catalog.ewu.edu/undergraduate-degree/#generaleducationrequirementstext) (GER)
- Minimum Credits—180 cumulative credit hours
  - 60 upper-division credits (300 level or above)
  - 45 credits in residence (attendance) at Eastern, with at least 15 upper-division credits in major in residence at Eastern
- Minimum Cumulative GPA ≥2.0

Breadth Area Core Requirements (BACR)
Humanities and Arts (http://catalog.ewu.edu/undergraduate-degree/#humanitiesandfineartsgecrtext)
Natural Sciences (http://catalog.ewu.edu/undergraduate-degree/#naturalsciencesgecrtext)
Social Sciences (http://catalog.ewu.edu/undergraduate-degree/#socialsciencesgecrtext)

University Graduation Requirements (http://catalog.ewu.edu/undergraduate-degree/#universitygraduationrequirementstext) (UGR)
Diversity Course List (http://catalog.ewu.edu/undergraduate-degree/#cultureandgenderdiversityintheuslisttext)
World Language (http://catalog.ewu.edu/undergraduate-degree/#worldlanguagetext) (for Bachelor of Arts)
Global Studies Course List (http://catalog.ewu.edu/undergraduate-degree/#internationalstudiesrequirementtext)
Minor or Certificate (http://catalog.ewu.edu/undergraduate-degree/#majorminororcertificateugrtext)
Senior Capstone Course List (http://catalog.ewu.edu/undergraduate-degree/#capstonecourselisttext)

Application for Graduation (use EagleNET (https://inside.ewu.edu/eaglenet/)) must be made at least two terms in advance of the term you expect to graduate (undergraduate and post-baccalaureate).

Use the Catalog Archives (http://catalog.ewu.edu/archives/) to determine *two important catalog years*.
Requirements in Degree Works (https://inside.ewu.edu/records-and-registration/degree-works/) are based on these two catalog years:

a. The catalog *in effect at the student's first term* of current matriculation is used to determine **BACR** (Breadth Area Credit Requirements) **and UGR** (Undergraduate Graduation Requirements).
b. The catalog *in effect at the time the student declares a major or minor* is used to determine the program requirements.

Students who earn a BS in Computer Science from EWU should be able to:

- analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions;
- design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline, utilizing techniques, skills, and tools necessary for computing practice;
- communicate effectively in a variety of professional contexts;
- recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles, including local and global impacts of computing solutions on individuals, organizations, and society;
- function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline;
- apply computer science theory and software development fundamentals to produce computing-based solutions;
- identify risk with regard to security, to participate in risk mitigation activities, and to provide application and information security.