

CYBER OPERATIONS MAJOR, BACHELOR OF SCIENCE (BS)

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.

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

Required Computer Science Courses 64

CSCD 202	COMPUTING ETHICS
CSCD 210	PROGRAMMING PRINCIPLES I
CSCD 211	PROGRAMMING PRINCIPLES II
CSCD 212	OBJECT ORIENTED PROGRAMMING WITH DESIGN PATTERNS
CSCD 240	C AND UNIX PROGRAMMING
CSCD 260	ARCHITECTURE AND ORGANIZATION
CSCD 300	DATA STRUCTURES
CSCD 303	COMPUTER AND INFORMATION SECURITY
CSCD 320	ALGORITHMS
CSCD 327	RELATIONAL DATABASE SYSTEMS
CSCD 330	COMPUTER NETWORKS
CSCD 340	OPERATING SYSTEMS
CSCD 350	SOFTWARE DEVELOPMENT PRINCIPLES
CSCD 488	SENIOR PROJECT

Required Cybersecurity Courses 28

CSCD 433	ADVANCED NETWORKING CONCEPTS
CSCD 434	NETWORK SECURITY
CSCD 437	SECURE CODING
CYBR 403	CYBERSECURITY POLICIES, PRIVACY AND LAWS
CYBR 410	APPLIED CYBER DEFENSE
CYBR 412	APPLIED CYBER OPERATIONS
CYBR 455	DIGITAL FORENSICS AND CYBERCRIME

Required Supporting Courses 15

EENG 160	DIGITAL CIRCUITS
MATH 301	DISCRETE MATHEMATICS
MATH 380	ELEMENTARY PROBABILITY AND STATISTICS

Required Electives—choose two courses from the following 8

Notes: No course may be used for an elective that is used to satisfy another major requirement. Upper division MATH or CSCD 495–499 courses must have prior department approval of topic content.

CSCD 409	SCIENTIFIC PROGRAMMING
CSCD 420	AUTOMATA AND COMPILERS
CSCD 423	RANDOMIZED ALGORITHMS AND PROBABILISTIC ANALYSIS
CSCD 427	ADVANCED DATABASE MANAGEMENT SYSTEMS
CSCD 429	DATA MINING
CSCD 430	BIG DATA ANALYTICS

CSCD 435	PRINCIPLES OF PROGRAMMING LANGUAGE
CSCD 439	TOPICS IN COMPUTER SCIENCE (prior department approval of content required)
CSCD 443	DISTRIBUTED MULTIPROCESSING
CSCD 445	GPU COMPUTING
CSCD 460	ADVANCED ARCHITECTURE AND ORGANIZATION
CSCD 461	EMBEDDED SYSTEMS
CSCD 462	EMBEDDED REAL-TIME CONTROL
CSCD 467	PARALLEL AND CLOUD COMPUTING
CSCD 470	3D COMPUTER GRAPHICS PRINCIPLES
CSCD 471	ADVANCED 3D COMPUTER GRAPHICS
CSCD 477	VIRTUAL REALITY AND DATA VISUALIZATION
CSCD 480	INTELLIGENT SYSTEMS
CSCD 483	MODELING AND SIMULATION
CSCD 487	HUMAN COMPUTER INTERFACE
CSCD 495	INTERNSHIP (up to two 4 credit internships are allowed)
CSCD 499	DIRECTED STUDY (prior department approval of content required)

Required Senior Capstone Series 5

CSCD 490	SENIOR CAPSTONE
Total Credits	120

University Competencies and Proficiencies

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

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

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

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

General Education Requirements (<http://catalog.ewu.edu/undergraduate-degree/#generaleducationrequirementsger>) (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 (<http://catalog.ewu.edu/undergraduate-degree/#generaleducationcorerequirementsgecr>) (BACR)

Humanities and Arts (<http://catalog.ewu.edu/undergraduate-degree/#humanitiesandfineartsgecr>)

Natural Sciences (<http://catalog.ewu.edu/undergraduate-degree/#naturalsciencesgecr>)

Social Sciences (<http://catalog.ewu.edu/undergraduate-degree/#socialsciencesgecr>)

University Graduation Requirements (<http://catalog.ewu.edu/undergraduate-degree/#universitygraduationrequirementsugr>) (UGR)

Diversity Course List (<http://catalog.ewu.edu/undergraduate-degree/#cultureandgenderdiversityintheuslist>)

Foreign Language (<http://catalog.ewu.edu/undergraduate-degree/#foreignlanguageugr>) (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>)

All admitted students must officially Declare a Major (<https://inside.ewu.edu/center-for-academic-advising-and-retention/academic-planning-tools/declare-your-major/>) by the time they reach 90 credits (junior standing).

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 (<https://catalog.ewu.edu/archives/>) to determine two important catalog years (<http://catalog.ewu.edu/undergraduate-degree/#activecatalogruletext>).

Degree Works (<https://inside.ewu.edu/records-and-registration/degree-works/>) calculates based on these two catalog years.

1. 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).
2. The catalog *in effect at the time the student declares a major or minor* is used to determine the program requirements.

Students Who Successfully Earn A BS In Cyber Operations From EWU Should Be Able To Do The Following:

- 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;
- apply security principles and practices to maintain operations in the presence of risks and threats.