

COMPUTER SCIENCE MAJOR (M)

The Computer Science program produces graduates highly skilled in creating, applying, and communicating complex technological solutions to organizational problems in the context of a Biblical worldview.

The BS degree program features 5 concentrations in Software Engineering, AI & Robotics, Cybersecurity, Animation, and Information Systems. All 5 concentrations share a common technology core which ensures students share an understanding of computer programming, computer hardware, and fundamental topics in Computer Science.

The concentrations allow a student to specialize in a specific area of Computer Science. Given the number of allowed free electives, students are invited to choose more than one concentration if that is of interest to them. Our students find high paying jobs in the technology sector of industry in areas involving software development, data science, artificial intelligence, robotics, cybersecurity, video game design, animation, as well as more hardware based vocations in the IT field. Students are often recruited by emerging technology firms looking for technology students capable of learning something new.

Our program emphasizes the idea that computer programming does not define Computer Science, but rather is the tool a Computer Scientist wields to solve problems. We also adopt the notion that the programming language is insignificant as programming is a skill, the language is how that skill is expressed. Programming is to the Computer Scientists as a tennis racket is to a tennis player. The grand ideas of Computer Science are then explored through the application of computer programming in the context of the various theoretical subjects offered by the department.

All students interested in problem solving in the world by leveraging technology should consider a major or minor in Computer Science!

Program Learning Outcomes

1- A: Professional responsibility. Students will recognize and be guided by the professional, legal and worldview issues involved in the use of computer technology.

2- B: Problem solving. Students will demonstrate how to solve problems in various user domains using the tools of computer science and information technology.

2- C: Elements of computational thinking. Students will recognize the broad relevance of computational thinking in everyday life as well as its applicability within other domains, and apply it in appropriate circumstances.

3- D: Modeling. Students will use such knowledge and understanding in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoff involved in design choices.

3- E: Methods and tools. Students will deploy appropriate theory, practices, and tools for the specification, design, implementation, and maintenance as well as the evaluation of computer-based systems.

4- F: Critical evaluation and testing. Students will analyze the extent to which a computer-based system meets the criteria defined for its current use and future development.

5- G: Requirements and Specifications. Students will identify and analyze criteria and specifications appropriate to specific problems, and plan strategies for their solution.

6- H: Knowledge and understanding. Students will exhibit knowledge and understanding of essential facts, concepts, principles, and theories relating to computer science and information technology (especially the nine grand ideas).

Curriculum

| Code | Title | Hours |
|---------------------------------------|-------|------------|
| Core Requirements ¹ | | 45 |
| Technical Core | | 36 |
| Major or Concentration | | 18 |
| Electives | | 21 |
| Total Hours | | 120 |

¹ For transfer students, please see the Advanced Transfer Core (<https://catalog.cuw.edu/undergraduate/university/acad-prog/trad/transfer-core/>).

| Code | Title | Hours |
|------|-------|-------|
|------|-------|-------|

Required Core Courses

| | | |
|----------|--|--|
| MATH 197 | Applied Calculus or MATH 201 Calculus I | |
| PHIL 211 | Elementary Logic | |

| Code | Title | Hours |
|-------------------------------|---|-----------|
| Technical Core Courses | | |
| MATH 205 | Statistics I | 3 |
| CSC 175 | Theory and Fundamentals of Computer Science | 3 |
| CSC 200 | Coding I- Fundamentals | 3 |
| CSC 250 | Coding II- Algorithms | 3 |
| CSC 325 | Computer Architecture | 3 |
| CSC 350 | Operating Systems | 3 |
| CSC 370 | Software Engineering | 3 |
| CSC 410 | Computational Dilemmas | 3 |
| CSC 420 | User Experience and Interactive Systems | 3 |
| CSC 430 | Database Fundamentals | 3 |
| CSC 460 | Advanced Database and Web Development | 3 |
| CSC 491 | Capstone Project | 3 |
| Total Hours | | 36 |

Select from the following 5 Concentrations:

| Code | Title | Hours |
|-----------------------------|------------------------------|--------------|
| <i>Software Engineering</i> | | |
| CSC 300 | Coding III- Data Structures | 3 |
| CSC 450 | Systems Programming | 3 |
| CSC 470 | Programming Language Theory | 3 |
| CSC 490 | Theoretical Computer Science | 3 |
| CSC Elective | | 3 |
| CSC 400 | Internship | 1-3 |
| Total Hours | | 16-18 |

| Code | Title | Hours |
|--------------------------|----------------------------------|-----------|
| <i>AI & Robotics</i> | | |
| CSC 300 | Coding III- Data Structures | 3 |
| CSC 415 | Artificial Intelligence | 3 |
| CSC 417 | Advanced Artificial Intelligence | 3 |
| CSC 419 | Machine Learning & Robotics | 3 |
| CSC 400 | Internship | 3 |
| Total Hours | | 15 |

| Code | Title | Hours |
|-----------------------|---------------------|--------------|
| <i>Cyber Security</i> | | |
| CSC 180 | Systems Integration | 3 |
| CSC 440 | Networks & Security | 3 |
| CSC 426 | Cybersecurity | 3 |
| CSC 428 | Penetration Testing | 3 |
| CSC Elective | | 3 |
| CSC 400 | Internship | 1-3 |
| Total Hours | | 16-18 |

| Code | Title | Hours |
|--------------------|---------------------|--------------|
| <i>Animation</i> | | |
| CSC 180 | Systems Integration | 3 |
| CSC 210 | Animation I | 3 |
| CSC 315 | Animation II | 3 |
| CSC 435 | Animation III | 3 |
| CSC Elective | | 3 |
| CSC 400 | Internship | 1-3 |
| Total Hours | | 16-18 |

| Code | Title | Hours |
|----------------------------|---------------------|--------------|
| <i>Information Systems</i> | | |
| CSC 180 | Systems Integration | 3 |
| CSC 426 | Cybersecurity | 3 |
| CSC 440 | Networks & Security | 3 |
| CSC 450 | Systems Programming | 3 |
| CSC Elective | | 3 |
| CSC 400 | Internship | 1-3 |
| Total Hours | | 16-18 |