### *Dr. Vincent Smith, Program Chair*

The University of Charleston School of Arts & Sciences offers a Bachelor of Science degree in Applied Computer Science with a choice of the following majors:

- Cybersecurity
- Information Technology
- Technology Applications
- Video Game Development

All majors under the Applied Computer Science degree program will complete a common core of 15 courses and 4 labs (50 credits) that provide students with a foundation of knowledge in all functional areas of computer science. Beyond the computer science core, students gain knowledge, skills, and abilities from specialized coursework for their majors. This program is designed to give students a common core of knowledge along with the ability to choose a major that meets their unique educational goals.

The degree program in Applied Computer Science equips individuals with a comprehensive understanding of technology skills, ethical principles, and analytical thinking to tackle the complexities of today's computer science landscape. By offering professional preparation and instilling a commitment to ongoing education, this program fosters the development of graduates who are well-equipped for successful careers in their chosen fields and are motivated to serve their communities.

### Applied Computer Science Core Learning Outcomes

The graduate will:

1. Apply knowledge of programming and computer networks to identify bugs or security threats and define the resources and/or requirements needed for their solution.
2. Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
3. Employ current techniques, skills, and tools necessary for computing practice, and recognize the need for continuing professional development.
4. Identify professional, ethical, legal, and security issues and responsibilities, and the impact of computing on individuals, organizations, and society.

### Applied Computer Science Core Program of Study

Students whose majors fall under Applied Computer Science are required to complete the following core requirements plus the additional requirements for their specific major:

| Applied Computer Science – Core Requirements for all Majors | | |
|---|---|---|
| COSC 110 | Computer Science I | 3 credits |
| COSC 110L | Computer Science I Lab | 1 credit |
| COSC 120 | Computer Science II | 3 credits |
| COSC 120L | Computer Science II Lab | 1 credit |
| COSC 245 | Internet of Things | 3 credits |
| COSC 250 | Comp Architecture & Organization | 3 credits |
| COSC 280 | Data Structures | 3 credits |
| COSC 315 | Database Systems | 3 credits |
| COSC 330 | Embedded Systems | 3 credits |
| COSC 340 | Operating Systems | 3 credits |
| COSC 345 | Computer Networks | 3 credits |
| COSC 355 | Mobile Computing | 3 credits |
| COSC 360 | Web App Development | 3 credits |
| COSC 390 | CS Workshop 1 | 2 credits |
| COSC 440 | Internship | 4 credits |
| COSC 450 | Capstone | 3 credits |
| MATH 240 | Probability and Statistics | 3 credits |
| CYBR 250 | Cloud Computing | 3 credits |
| | **Total Credits for Core:** | **50** |

### Admission Requirements

Students must gain general admission to the University of Charleston.

### Additional Requirements

To register for a course, students must meet all prerequisite requirements for that course or obtain instructor approval.

To graduate, students must earn a C or better in all courses required for the major.

Applied Computer Science students must meet all University of Charleston graduation requirements.

While a Mac may be used in some courses, Applied Computer Science students are required to have a modern Windows computer capable of running the required programs. Students in the video game development major may require a low-end modern gaming laptop (minimum) to complete some assignments.

# CYBERSECURITY MAJOR

## Bachelor of Science
### *Dr. Vincent Smith, Program Chair*

### Cybersecurity Major Mission Statement

Our mission is to prepare students with skills in cybersecurity solutions that enable individuals and organizations to work productively and efficiently in a secure environment. Our mission is achieved using cutting-edge technology and industry best practices to deliver reliable and effective cybersecurity services that meet client needs; we seek to empower individuals with the knowledge and skills they need to protect themselves and their communities from cyber threats.

### Program Description

Our cybersecurity program is designed to provide students with comprehensive and effective solutions to protect individuals, businesses, and organizations from cyber threats in addition to the core computer science coursework. Students learn a wide variety of topics such as risk assessments, vulnerability testing, incident response planning, and security training. Our program emphasizes a proactive approach to cybersecurity, focusing on prevention as well as response. The program prepares students to implement robust security measures, including firewalls, intrusion detection systems, and encryption, to reduce the risk of cyber-attacks.

The Cybersecurity major is offered as an in-seat residential program on the Charleston campus*. Students complete a 50-credit computer science core and further* coursework in cybersecurity. All CYBR classes will be taken in the online format. Students have the opportunity to double major in Information Technology, Video Game Development, Technology Applications, or Data Analytics.

### Cybersecurity Learning Outcomes

In addition to the Applied Computer Science core learning outcomes, the graduate will:

1. Detect, assess, remediate, and communicate ongoing cybersecurity threats and vulnerabilities.

### Cybersecurity Major Courses

In addition to the Applied Computer Science core courses, students must complete the following courses:

| Cybersecurity Major Courses | | |
|---|---|---|
| COSC 310 | Software Engineering | 3 credits |
| COSC 430 | Cryptology | 3 credits |
| CYBR 100 | Intro to Computers (A+ Certification) | 3 credits |
| CYBR 110 | Intro to Networking (NET + Certification) | 3 credits |
| CYBR 120 | Intro to Security (Security+ Certification) | 3 credits |
| CYBR 320 | Ethical Hacking & Countermeasures | 3 credits |
| CYBR 330 | Incident Handler | 3 credits |

| Cybersecurity Major Courses | | |
|---|---|---|
| CYBR 340 | Security Analysis | 3 credits |
| MATH 201 | Calculus I | 4 credits |
| MATH 225 | Discrete Mathematics | 3 credits |
| | **Credits for Cybersecurity:** | **31+ 50 (Core) = 81** |

Total Credit hours: 120

*Students may be required to complete some courses in online or hybrid formats.

**A low-math path is available for students who are entering below the pre-calculus level.

***MATH 201 requires MATH 123 or Math ACT Score 27 (Math SAT score 640).

**Bachelor of Science**
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### Information Technology Major Mission Statement

Our mission is to prepare students to work in the information technology industry through challenging coursework, exposing them to diverse perspectives, and providing opportunities for community service and experiential learning through in-class assignments, workshops, and internships.

### Program Description

Our information technology program is designed to provide students with the knowledge and skills necessary to succeed in the technology industry. The program covers a broad range of topics, including computer programming, database management, networking, cybersecurity, and web development. In addition to technical skills, our program also emphasizes the development of soft skills such as communication, teamwork, and problem-solving. These skills are essential for success in the technology industry, where professionals must be able to work collaboratively and adapt to changing technologies and environments. During the program, students will have the opportunity to develop a strong foundation in computer science and information technology concepts. Our experiential learning approach is critical for students to gain the skills and knowledge needed to solve real-world problems in the technology industry.

The Information Technology major is offered as an in-seat residential program on the Charleston campus*. Students complete a 50-credit computer science core and further coursework in information technology. This unique option allows students who struggle in mathematics to take less mathematics classes than other Applied Computer Science major options. Students have the opportunity to double major in Cybersecurity, Video Game Development, Technology Applications, or Data Analytics.

### Information Technology Learning Outcomes

In addition to the Applied Computer Science core learning outcomes, the graduate will:

1. Detect, assess, remediate, and communicate technological issues in both hardware and software.

### Information Technology Major Courses

In addition to the Applied Computer Science core courses, students must complete the following courses:

| Information Technology Major Courses | | |
|---|---|---|
| COSC 100 | Coding Languages for Industry I | 3 credits |
| COSC 200 | Coding Languages for Industry II | 3 credits |
| COSC 305 | Hardware Solutions | 3 credits |
| COSC 365 | Problem Solving for IT Professionals | 3 credits |
| CYBR 100 | Intro to Computers (A+ Certification) | 3 credits |
| CYBR 110 | Intro to Networking (NET + Certification) | 3 credits |

| Information Technology Major Courses | | |
|---|---|---|
| CYBR 120 | Intro to Security (Security+ Certification) | 3 credits |
| DMDS 201 | Digital Media and Graphics (Humanities Flex) | 3 credits |
| | **Hours for IT:** | **24 + 50 (Core) = 74** |

Total Credit hours: 122

*Students may be required to complete some courses in online or hybrid format.

**Bachelor of Science**
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**Technology Applications Major Mission Statement**

Our mission is to equip students with the knowledge and skills necessary to effectively leverage technology in various fields and industries. The program aims to promote innovation, creativity, and critical thinking, while instilling ethical values and a commitment to social responsibility. Our mission is achieved by producing graduates who are not only technically proficient but also ethical, socially responsible, and committed to using technology to create a better world.

**Program Description**

Our technology applications program is designed to give students flexibility while completing their Applied Computer Science degree. Students choose restricted electives in computer science, cybersecurity, data analytics, digital media and design, mathematics, or video game development. Our graduates are equipped to pursue careers in a wide variety of industries, including software development, project management, and user experience design. Graduates may also continue their education through graduate studies in a technology or mathematics field depending on which courses they choose to take as restricted electives.

The Cybersecurity major is offered as an in-seat residential program on the Charleston campus*. Students complete a 50-credit computer science core and further coursework in mathematics and their choice of restricted electives. Students have the opportunity to double major in Cybersecurity, Information Technology, Video Game Development, or Data Analytics.

**Technology Applications Learning Outcomes**

In addition to the Applied Computer Science core learning outcomes, the graduate will:

1. Apply knowledge of mathematics to implement security, assess algorithmic efficiency, and analyze data.

**Technology Applications Major Courses**

In addition to the Applied Computer Science core courses, students must complete the following courses:

| Technology Applications Major Courses | | |
|---|---|---|
| COSC 430 | Cryptology | 3 credits |
| MATH 230 | Linear Algebra | 3 credits |
| MATH 201 | Calculus I | 4 credits |
| MATH 225 | Discrete Mathematics | 3 credits |
| * | Restricted Elective | 3 credits |
| * | Restricted Elective | 3 credits |
| * | Restricted Elective | 3 credits |

| Technology Applications Major Courses | | |
|---|---|---|
| * | Restricted Elective | 3 credits |
| | **Hours for Technology Applications:** | **25 + 50 (Core) = 75** |

Total Credit hours: 121

*Students may be required to complete some courses in online or hybrid formats.

**A low-math path is available for students who are entering below the pre-calculus level.

***MATH 201 requires MATH 123 or Math ACT Score 27 (Math SAT score 640).

****Restricted Electives are satisfied by any course in COSC, CYBR, DASC, DMDS, GAME, or a 200-level or higher course in MATH.

**Bachelor of Science**
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**Video Game Development Major Mission Statement**

Our mission is to prepare skilled professionals for jobs in the video game industry by creating graduates who are technically proficient and committed to creating video games that entertain, educate, and inspire. The program aims to foster creativity, innovation, and critical thinking while instilling ethical values and a commitment to social responsibility.

**Program Description**

Our video game development program is designed to give students the opportunity to gain hands-on experience by developing video games from concept to launch. They will work in teams to create game prototypes, refine game mechanics, and implement game features. Through projects, internships, and other experiential learning opportunities, students develop technical skills in areas such as programming, game engines, 3D modeling, animation, and sound design. The program also emphasizes the development of soft skills such as communication, collaboration, and leadership. Students are encouraged to work in teams, communicate effectively, and manage projects efficiently.

The Video Game Development major is offered as an in-seat residential program on the Charleston campus*. Students complete a 50-credit computer science core and further coursework in video game development. Students have the opportunity to double major in Cybersecurity, Information Technology, Technology Applications, or Data Analytics.

**Video Game Development Learning Outcomes**

In addition to the Applied Computer Science core learning outcomes, the graduate will:

1. Develop and design video game structure and components to meet desired outcomes.

**Video Game Development Major Courses**

In addition to the Applied Computer Science core courses, students must complete the following courses:

| Video Game Development Major Courses | | |
|---|---|---|
| COSC 310 | Software Engineering | 3 credits |
| COSC 430 | Cryptology | 3 credits |
| CYBR 100 | Intro to Computers (A+ Cert) | 3 credits |
| GAME 101 | Intro to Games | 3 credits |
| GAME 102 | Content & Systems Design | 3 credits |
| GAME 201 | Unity I | 3 credits |
| GAME 300 | C# Programming | 3 credits |
| GAME 301 | Unity II | 3 credits |

| Video Game Development Major Courses | | |
|---|---|---|
| DMDS 201 | Digital Media and Graphics | 3 credits |
| DMDS 210 | 3D Design and Product Development | 3 credits |
| DMDS 301 | Animation, Motion, and Editing | 3 credits |
| MATH 201 | Calculus I | 4 credits |
| MATH 225 | Discrete Mathematics | 3 credits |
| | **Hours for Video Game Development:** | **40 + 50 (Core) = 90** |

Total Credit hours: 120

*Students may be required to complete some courses in online or hybrid formats.

**A low-math path is available for students who are entering below the pre-calculus level.

***MATH 201 requires MATH 123 or Math ACT Score 27 (Math SAT score 640).

### APPLIED COMPUTER SCIENCE MINOR

Students pursuing other academic majors may complete a 20 hour Applied Computer Science Minor.

| Applied Computer Science Minor | | |
|---|---|---|
| COSC 110/110L | Computer Science I & Lab | 4 credits |
| COSC 120/120L | Computer Science 2 & Lab | 4 credits |
| COSC 280 | Data Structures | 3 credits |
| COSC 315 | Intro to Database Systems | 3 credits |
| COSC 340 | Operating Systems | 3 credits |
| COSC 345 | Computer Networks | 3 credits |
| | **Total Credits  20** | |

Students must earn a C or better in all courses required for the minor.

Students pursuing other academic majors may complete a 21 hour Video Game Development Minor.

| Video Game Development Minor | | |
|---|---|---|
| COSC 100 | Introduction to Applied Computer Science | 3 credits |
| COSC 200 | Applied Computer Science | 3 credits |
| GAME 101 | Introduction to Games | 3 credits |
| GAME 102 | Content & Systems Design | 3 credits |
| GAME 201 | Unity I | 3 credits |
| GAME 300 | C# Programming | 3 credits |
| GAME 301 | Unity II | 3 credits |
| **Total Credits** | | **21** |

Students must earn a C or better in all courses required for the minor.