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
COSC 110L	Computer Science I Lab	1
COSC 120	Computer Science II	3
COSC 120L	Computer Science II Lab	1
COSC 245	Internet of Things	3
COSC 250	Comp Architecture & Organization	3
COSC 280	Data Structures	3
COSC 315	Database Systems	3
COSC 330	Embedded Systems	3
COSC 340	Operating Systems	3
COSC 345	Computer Networks	3
COSC 355	Mobile Computing	3
COSC 360	Web App Development	3
COSC 390	CS Workshop 1	1
COSC 391	CS Workshop 2	1
COSC 440	Internship	4
COSC 450	Capstone	3
MATH 240	Probability and Statistics	3
CYBR 250	Cloud Computing	3
	Total Hours 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

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
COSC 430	Cryptology	3
CYBR 100	Intro to Computers (A+ Certification)	3
CYBR 110	Intro to Networking (NET + Certification)	3
CYBR 120	Intro to Security (Security+ Certification)	3
CYBR 320	Ethical Hacking & Countermeasures	3
CYBR 330	Incident Handler	3
CYBR 340	Security Analysis	3

Cybersecurity Major Courses		
MATH 201	Calculus I	4
MATH 225	Discrete Mathematics	3
	Hours for Cybersecurity:	**31+ 50 (Core) = 81**

Standard Four-Year Path**

FIRST YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
ENGL 101 Freshman Writing I	3	ENGL 102 Freshman Writing II	3
CYBR 100 Intro to Computers	3	MATH 201 Calculus 1*** (STEM Flex)	4
COSC 110 Computer Science 1 (STEM Flex)	3	COSC 120 Computer Science 2	3
COSC 110L Computer Science 1 Lab	1	COSC 120L Computer Sci. 2 Lab	1
Elective (MATH 123 if needed)	3	SPCH 103 Speech (embedded)	3
UNIV 104 College Motivation & Success	3	UNIV 105 Foundations of Character & Leadership	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**17**

SECOND YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
MATH 225 Discrete Math (STEM Flex Elective)	3	CYBR 110 Intro to Networking	3
COSC 280 Data Structures	3	MATH 240 Prob and Stat (STEM Flex)	3
COSC 245 Internet of Things	3	CYBR 120 Intro to Security	3
Elective	3	COSC 250 Comp Arch & Org	3
HUMN Humanities Flex Course	3	SSCI Soc. Sci. Flex Course	3
TOTAL CREDITS	**15**	**TOTAL CREDITS**	**15**

THIRD YEAR				
FALL SEMESTER		**SPRING SEMESTER**		
COCS 395 CS Workshop 1	1	COSC 396 CS Workshop 2	1
Humanities Flex Elective	3	COSC 355 Mobile Computing	3
COSC 360 Web App Development	3	COSC 340 Operating Systems	3
COSC 330 Embedded Systems	3	CYBR 250 Cloud Computing	3
COSC 345 Computer Networks	3	CYBR 330 Incident Handler	3
CYBR 320 Ethical Hacking & Countermeasures	3	COCS 315 Database Systems	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**16**

FOURTH YEAR				
FALL SEMESTER		**SPRING SEMESTER**		
COSC 440 Co-op Experience	4	COSC 450. Capstone	3
SSCI Soc. Sci. Flex Course	3	Elective	3
COSC 310 Software Engineering	3	COSC 430 Cryptology	3
Elective	3	CYBR 340 Security Analysis	3
TOTAL CREDITS	**13**	**TOTAL CREDITS**	**12**

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.

INFORMATION TECHNOLOGY MAJOR

Dr. Vincent Smith, Program Chair

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

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

Standard Four-Year Path

FIRST YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
ENGL 101 Freshman Writing I	3	ENGL 102 Freshman Writing II	3
COSC 100 Intro to Applied CS (STEM Flex)	3	COSC 200 Intro to Applied CS II	3
CYBR 100 Intro to Computers	3	MATH 121 College Algebra (or higher) (STEM Flex Elective)	3
STEM Flex Elective (MATH 120 if needed)	3	SPCH 103 Speech (embedded)	3
UNIV 104 College Motivation & Success	3	UNIV 105 Foundations of Character & Leadership	3
TOTAL CREDITS	**15**	**TOTAL CREDITS**	**15**

SECOND YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
DMDS 201 Digital Media and Graphics (HUMN Flex)	3	Elective	3
COSC 110 Computer Science I (STEM Flex)	3	CYBR 120 Intro to Security	3
COSC 110L Computer Science I Lab	1	COSC 120 Computer Science II	3
Elective	3	COSC 120L Computer Science II Lab	1
CYBR 110 Intro to Networking	3	SSCI Soc. Sci. Flex Course	3
Elective	3	SSCI Soc. Sci. Flex Course	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**16**

THIRD YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
COCS 395 CS Workshop 1	1	COSC 396 CS Workshop 2	1
COSC 280 Data Structures	3	MATH 240 Prob and Stat (STEM Flex)	3
Humanities Flex Course	3	COSC 245 Internet of Things	3
Elective	3	CYBR 250 Cloud Computing	3
COSC 305 Hardware Solutions	3	COSC 365 Problem Solving for IT Professionals	3
Elective	3	COSC 250 Computer Arch & Org	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**16**

FOURTH YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
COSC 440 Co-op Experience	4	COSC 450 Capstone	3
COSC 345 Computer Networks	3	COSC 340 Operating Systems	3
Elective	3	COSC 355 Mobile Computing	3
COSC 330 Embedded Systems	3	COSC 315 Database Systems	3
COSC 360 Web App Development	3		
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**12**

Total Credit hours: 122

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

TECHNOLOGY APPLICATIONS MAJOR

Dr. Vincent Smith, Program Chair

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
MATH 230	Linear Algebra	3
MATH 201	Calculus I	4
MATH 225	Discrete Mathematics	3
*	Restricted Elective	3
*	Restricted Elective	3
*	Restricted Elective	3
*	Restricted Elective	3

Technology Applications Major Courses		
Hours for Technology Applications:		**25 + 50 (Core) = 75**

<p align="center">Standard Four-Year Path**</p>

FIRST YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
ENGL 101 Freshman Writing I	3	ENGL 102 Freshman Writing II	3
SSCI Soc Sci Flex Course	3	MATH 201 Calculus 1*** (STEM Flex)	4
COSC 110 Computer Science 1 (STEM Flex)	3	COSC 120 Computer Science 2	3
COSC 10L Computer Science 1 Lab	1	COSC 120L Computer Sci. 2 Lab	1
Elective (MATH 123 if needed)	3	SPCH 103 Speech (embedded)	3
UNIV 104 College Motivation & Success	3	UNIV 105 Foundations of Character & Leadership	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**17**

SECOND YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
MATH 225 Discrete Math (STEM Flex Elective)	3	HUMN Humanities Flex Course	3
COSC 280 Data Structures	3	MATH 240 Prob and Stat (STEM Flex Elective)	3
COSC 245 Internet of Things	3	COSC 250 Comp Arch & Org	3
Elective	3	SSCI Soc. Sci. Flex Course	3
HUMN Humanities Flex Course	3	MATH 230 Linear Algebra	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**15**

THIRD YEAR				
FALL SEMESTER		**SPRING SEMESTER**		
COCS 395 CS Workshop 1	1	COSC 396 CS Workshop 2	1
Elective	3	COSC 355 Mobile Computing	3
COSC 360 Web App Development	3	COSC 340 Operating Systems	3
COSC 330 Embedded Systems	3	COSC 315 Database Systems	3
COSC 345 Computer Networks	3	CYBR 250 Cloud Computing	3
Restricted Elective****	3	Restricted Elective****	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**16**

FOURTH YEAR				
FALL SEMESTER		**SPRING SEMESTER**		
COSC 440 Co-op Experience	4	COSC 450. Capstone	3
Elective	3	Elective	3
Elective	3	Restricted Elective****	3
Restricted Elective****	3	COSC 430 Cryptology	3
TOTAL CREDITS	**13**	**TOTAL CREDITS**	**12**

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.

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

VIDEO GAME DEVELOPMENT MAJOR

Dr. Vincent Smith, Program Chair

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
COSC 430	Cryptology	3
CYBR 100	Intro to Computers (A+ Cert)	3
GAME 101	Intro to Games	3
GAME 102	Content & Systems Design	3
GAME 201	Unity I	3
GAME 300	C# Programming	3
GAME 301	Unity II	3
DMDS 201	Digital Media and Graphics	3

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

Standard Four-Year Path**

FIRST YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
ENGL 101 Freshman Writing I	3	ENGL 102 Freshman Writing II	3
CYBR 100 Intro to Computers	3	MATH 201 Calculus 1*** (STEM Flex)	4
COSC 110 Computer Science I (STEM Flex)	3	COSC 120 Computer Science II	3
COSC 110L Computer Science I Lab	1	COSC 120L Computer Sci. II Lab	1
Elective (MATH 123 if needed)	3	SPCH 103 Speech (embedded)	3
UNIV 104 College Motivation & Success	3	UNIV 105 Foundations of Character & Leadership	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**17**

SECOND YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
MATH 225 Discrete Math STEM Flex (STEM Flex Elective)	3	GAME 102 Content & System Design	3
COSC 280 Data Structures	3	MATH 240 Prob and Stat (STEM Flex Elective)	3
COSC 245 Internet of Things	3	DMDS 201 Digital Media and Graphics (HUMN Flex)	3
GAME 101 Introduction to Games	3	COSC 250 Comp Arch & Org	3
HUMN Humanities Flex Course	3	SSCI Soc. Sci. Flex Course	3
TOTAL CREDITS	**15**	**TOTAL CREDITS**	**15**

THIRD YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
COCS 395 CS Workshop 1	1	COSC 396 CS Workshop 2	1
GAME 201 Unity I	3	COSC 355 Mobile Computing	3
COSC 360 Web App Development	3	COSC 340 Operating Systems	3
COSC 330 Embedded Systems	3	GAME 300 C# Programming	3
COSC 345 Computer Networks	3	DMDS 301 Animation, Motion, and Editing	3
DMDS 210 3D Design and Product Development	3	CYBR 250 Cloud Computing	3
TOTAL CREDITS	**16**	**TOTAL CREDITS**	**16**

FOURTH YEAR			
FALL SEMESTER		**SPRING SEMESTER**	
COSC 440 Co-op Experience	4	COSC 450. Capstone	3
SSCI Soc. Sci. Flex Course	3	COSC 315 Database Systems	3
COSC 310 Software Engineering	3	Elective	3
GAME 301 Unity II	3	COSC 430 Cryptology	3
TOTAL CREDITS	**13**	**TOTAL CREDITS**	**12**

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.

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
COSC 120/120L	Computer Science 2 & Lab	4
COSC 280	Data Structures	3
COSC 315	Intro to Database Systems	3
COSC 340	Operating Systems	3
COSC 345	Computer Networks	3
	Total Credits 20	

VIDEO GAME DEVELOPMENT MINOR

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