



**SHENANDOAH®**  
UNIVERSITY

College of Arts & Sciences

# ***DIVISION OF APPLIED TECHNOLOGY***



*2023 Undergraduate Programs*



## ***MESSAGE FROM THE DEAN***

**Shenandoah University's Division of Applied Technology** has emerged as an innovator in a broad range of cutting-edge programs, including computer science and cybersecurity, augmented and virtual reality, data science and artificial intelligence and information technology. As one of the first universities in the nation to develop a major in applied and virtual reality, Shenandoah is at the forefront of immersive technology in higher education. The Shenandoah Center for Immersive Learning (SCIL) collaborates with industry and university partners across the nation and globally on truly groundbreaking projects. Our faculty draws upon a unique blend of industry and academic experience to prepare students to enter directly into dynamic careers or continue their studies in leading graduate programs. And DAT students are in high demand, with our graduates working in a range of technology-related industries. Whether your interest lies in computer science, information technology, data analytics and artificial intelligence or AR/VR, Shenandoah University will match your passions, talents and skills with opportunities for success. We invite you to visit us to learn more about our programs and to meet our faculty.



Jeffrey Coker, Ph.D.

*Dean, College of Arts & Sciences*





# ***DIVISION OF APPLIED TECHNOLOGY***

**Join one of the world's largest and fastest-growing industries.** Government, businesses, health care and nonprofits all require applied technology skills for everyday operations. We take a humanistic approach to technology at Shenandoah, meaning that you'll always consider how technology is used and how it benefits others.

## **Majors**

- **Computer Science**
- **Cybersecurity**
- **Data Science & Applied Mathematics**
- **Information Technology**
- **Mathematics**
- **Virtual Reality Design**

## **Minors**

- **Artificial Intelligence**
- **Computer Science**
- **Cybersecurity**
- **Data Science**
- **Game Design and Development**
- **Information Technology**
- **Mathematics**
- **Virtual Reality Design**

## **Certificates**

- **History & Immersive Technology**
- **IT/Cybersecurity Technician**
- **Virtual Reality Design**

# Computer Science

**The Bachelor of Science in Computer Science** program brings together students across many disciplines. Our programming students will also have the opportunity to work with robots to make programming fun. Students will learn the Python programming language and will learn about emerging areas such as artificial intelligence.

Computer science and programming skills are becoming increasingly necessary in many fields. In science fields, the ability to program is becoming essential in many areas of research. Programming and computer science skills also increase earning potential for new graduates.

**Job Outlook:** Nationally, computer science majors can expect to start at \$89,000 per year on average, according to the Bureau of Labor Statistics' Occupational Outlook.

**Job Titles:** Application developer, computer scientist, programmer, software developer



# Cybersecurity

## **The Bachelor of Science in Cybersecurity**

provides a strong foundation in computer science and mathematics as well as practical digital security knowledge and skills. This applied program provides students with hands-on experience using the latest tools and technologies to protect digital information, computing systems and networks from cyber attacks.

Students receive a MacBook that contains the vital cyber tools used in virtual cyberlabs with access to our on-campus networking equipment and other hardware for hands-on activities and professional preparation. They will be prepared to earn security certifications and enter professional fields or graduate programs in cybersecurity.

**Job Outlook:** Nationally, 32% employment growth is expected through 2028.

**Job Titles:** Cybersecurity specialist, information security analyst, cybersecurity engineer, security administrator

**The Minor in Cybersecurity** is designed to augment any technical program of study as students learn about cybersecurity threats and defense strategies. Students who complete this minor will be prepared for an entry-level cybersecurity support position.

“I am a tutor for the Math Enrichment Center on campus. I help students become better learners, make them excited about math, and help them realize they are capable in the field. Math is a way of thinking in life; it's a process that creates order, helps us solve all problems, and if you really think about it, math can even be considered an art and beautiful.”

– April Ulrich '23  
Mathematics, Data Science and Dance majors



# Data Science & Applied Mathematics

## The Bachelor of Science in Data Science & Applied Mathematics

provides an interdisciplinary foundation in computer science, statistics and mathematics along with practical experience deriving knowledge from real-world data. Students use deep learning, distributed computing paradigms, visualization and data collection from physical sensors to solve community and regional problems. Data is critical in the modern workforce, across all industries.

**Job Outlook:** Nationally, 28% employment growth is expected through 2028.

**The Minor in Data Science** provides students with the decision-making skills required to meet the demands of the data-driven workplace. This minor is an excellent complement, with marketable skills, to almost any major. Students enter the workforce not only with increased quantitative abilities but with a strong foundation in the pillars of data science — statistical analysis, computer science and real-world experience.

# Information Technology

## The Bachelor of Science in Information Technology

prepares students to work in a wide range of technical fields, including robotics/the internet of things, e-commerce applications, network and telecommunications support, IT security support, virtual reality and data analysis. In addition to access to the cyber lab and Shenandoah Center for Immersive Learning (SCiL) lab, IT students have the opportunity to work with drones and computer hardware kits.

The applied nature of the degree prepares graduates to follow a range of technical career paths including IT administration, network administration, product development, client support, project planning and project management, as well as graduate programs in information technology.

**Job Outlook:** Depending on the area, job growth may be 10% or more through 2028.

## The Minor in Information Technology

augments any major by giving students the technical abilities needed to be competitive in today's information-based workplace. Classes are based on hands-on activities designed to build real-world skills.

## The Information Technology/Cybersecurity Certificate

gives students pursuing an IT major or minor, cybersecurity major or virtual reality major a credential that they can use to apply for entry-level tech jobs. Classes are based on hands-on activities designed to build real-world technology skills.





## Mathematics

**The Bachelor of Science in Mathematics** provides students with analytic reasoning, applied mathematics knowledge and problem-solving skills. The degree complements additional coursework in computer science, data science, cybersecurity, statistics, business and many other majors. The program prepares students to enter a graduate program or seek employment in industry or research.

**The Bachelor of Arts in Mathematics** surveys all branches of mathematics. This applied degree complements coursework in the humanities, arts and sciences. Students are prepared for careers in teaching and other fields requiring a background in quantitative reasoning.

**Job Outlook:** Employment of mathematicians is projected to grow 26% from 2018 to 2028, much faster than the average for all occupations.

**Job Titles:** Mathematician, statistician, analyst, actuary, operations research analyst, teacher

**The Mathematics Minor** offers students a modern view of mathematics and its applications in the real world. The program complements a multitude of majors across the university, including business and pre-health programs.

# Virtual Reality Design

**Immersive experiences are transforming various types of businesses and organizations, creating exciting workforce opportunities.** At SU, students may choose either a Bachelor of Science or Bachelor of Arts in Virtual Reality Design. Both BA and BS students complete a common set of foundation courses, two lab courses, immersive technology electives and a two-semester capstone sequence in which they complete a real project working with a client or as part of an internship. All students gain practical experience using industry-standard equipment and design tools.

**The Bachelor of Science in Virtual Reality Design** prepares students for careers working as technical specialists, developers and/or programmers in emerging immersive technologies. Students gain practical experience working with widely used software development environments, game engines and virtual worldbuilding tools using state-of-the-art equipment.

**The Bachelor of Arts in Virtual Reality Design** prepares students for careers producing high-quality content for emerging immersive technologies. This degree track prepares students to specialize in 360 video or AR/VR content production. Students gain experience writing, filming, editing and directing immersive content.

## Notable Student Projects

A recent Virtual Reality Design graduate designed, tested and built a virtual reality application to diagnose attention deficit disorders like ADHD, and along with Associate Professor of AR/VR Mohammad F. Obeid, Ph.D., recently had a peer-reviewed article about the work published at the EDULEARN22 conference in Spain.

Other students are working on a historically accurate recreation of the Constitutional Convention of 1787 under the direction of our VR and History faculty using state-of-the-art motion capture technology.





“Paired with state-of-the-art and fully equipped labs and facilities, academic programs in Shenandoah's Division of Applied Technology allow students to engage in cutting-edge, creative and competitive learning and scholarship.”

– Mohammad F. Obeid, Ph.D.  
Assistant Professor and Program Coordinator,  
Virtual Reality Design

**Job Outlook:** Skills in augmented/virtual/mixed realities are continuously being sought after:

- Demand for AR/VR developers grew 1,400% from 2018 to 2019. [Hired]
- Global VR to reach ~\$26.89 billion by 2022, 54.01% growth between 2017 and 2022. [Zion Market Research]
- Demand for 3D talent is growing 600% faster than the labor market. [Burning Glass Technologies]
- National average salary of an extended reality developer is ~\$85,000/year, and reaches \$156,000/year in some cities. [Zip Recruiter]

**Job Titles:** Software developer/engineer, graphics designer/engineer, AR/VR maintenance/technical support specialist, VR project manager (and similar titles)

**The Virtual Reality Minor** enhances many majors by giving students experience with this emerging technology. Students learn how to use the equipment and software necessary to design and build immersive experiences.

**The Minor in Game Design** and Development complements knowledge acquired by students in their majors with a technical multidisciplinary understanding of game design and programming concepts.

**The Virtual Reality Certificate** gives students a broad foundation in AR/VR tools, systems and methods. Students gain practical experience working on real projects. This program is designed for students who are majoring in another field and/or who have already graduated with another degree in a different field and are seeking an additional credential in this exciting new discipline.

“I chose SU because of the VR program. There is a large focus in the B.S. program on the programming aspect of VR (constructing interactions and environments within Unity); however, the VR program as a whole also covers many of the important aspects of what virtual reality does, such as immersion and presence. One of the biggest things I gained from the VR design program was an opportunity to create a VR program that has an impact on the real world. For my capstone project, I worked with Dr. Obeid and two other students in tandem with an overseas university to create a simulation for nursing students that would educate them on the fundamentals of nursing procedures.”

– Orion Tighe '22  
B.S. Virtual Reality Design | Information Technology minor

# **SHENANDOAH CENTER FOR IMMERSIVE LEARNING**

## **The Shenandoah Center for Immersive Learning (SCiL)**

is a research and teaching laboratory at SU that focuses on extended reality (XR) applications, 3D user interfaces, human-to-human connectivity within mixed realities and transforming ideas into living experiences through immersive technology.

SCiL is actively building a culture of inclusiveness and opportunity. As students progress, they are given the opportunity to bring their own ideas to life as they work on real-world projects using state-of-the-art tools.

**Our students have contributed to a wide range of projects that support education and the community, including:**

**“A challenging curriculum, welcoming environment and hands-on project experience with outstanding students and faculty make Shenandoah a premier destination for math, science and technology learning.”**

*– Ralph Wojtowicz, Ph.D.*

*Director, Division of Applied Technology and Associate Professor of Mathematics*

- A nursing training simulation as part of an international partnership.
- The augmented reality app, "Through Their Eyes," that allows students to explore the personal experiences of soldiers in the aftermath of the Civil War Battle of Cool Spring and can be downloaded for free onto Apple and Android devices.



# ***SHENANDOAH UNIVERSITY HONORS PROGRAM***

The Shenandoah University Honors Program fosters the continued intellectual and personal growth of students who excel academically and creatively by providing them with rigorous and engaging learning experiences within a cohesive multidisciplinary community. All honors courses complement the SU general education program and the university's dedication to advancement in knowledge, critical thinking and communication. Each course emphasizes the multidisciplinary nature of any career or scholarly activity and provides advanced instruction in communication, reflection and ethical reasoning. Additionally, three honors seminars focus on how to make a difference within global and local communities.

[su.edu/honors](https://su.edu/honors)



# SHENANDOAH FACTS

- 2,203 undergraduate students
- Student-to-faculty ratio: 10 to 1
- Established 1875
- Located in Winchester, Virginia

## ***DIVISION OF APPLIED TECHNOLOGY***

- **The Hub for Innovators, Veterans and Entrepreneurs (HIVE)** is transforming a historic armory building on our main campus into a future-focused and boundary-breaking technology hub, innovation accelerator and magnet location for tech business startup, expansion and relocation.
- **We are a proud member of the National Center for Women & Information Technology Academic Alliance.** NCWIT increases the influence and meaningful participation of girls and women in the influential field of computing.
- **Assistant Professor of Virtual and Augmented Reality Mohammad Obeid, Ph.D.**, recently secured a \$95,000 research grant from the Center for Islam in the Contemporary World to create an immersive virtual reality experience to serve as a training and education platform for the primary religious pilgrimages in the Islamic faith.



### **Contact the Office of Admissions**

Call: 540-665-4581 | Text: 540-592-4518 | Email: [admit@su.edu](mailto:admit@su.edu)



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