



SHENANDOAH  
UNIVERSITY

College of Arts & Sciences

# ***DIVISION OF APPLIED TECHNOLOGY***



*2024 Undergraduate Programs*

# TECH MAJORS CRACK THE CAREER CODE

As one the first universities in the nation to develop a major in augmented and virtual reality design, Shenandoah is at the forefront of immersive technology in higher education. Our applied technology students are in high demand, with our graduates working in a range of technology-related industries.



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.



# ***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
- Engineering
  - ◇ Computer Engineering
  - ◇ Engineering Physics
  - ◇ Simulation Engineering
  - ◇ Software Engineering
- Information Technology
- Mathematics
- Virtual Reality Design

## ***MINORS***

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

## ***CERTIFICATE PROGRAMS***

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



**“The DAT program helped me in achieving my dreams of becoming a mathematician and programmer ready for the real world. SU provided me with opportunities such as interning at NASA that prepared me for this career. Shortly after graduation, I began my STEM career at Johns Hopkins Applied Physics Laboratory as a mathematician and engineer.”**

– April Ulrich '23,  
B.S. Mathematics, B.S. Data  
Science and B.A. Dance

## Computer Science

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

Computer science and programming skills are becoming increasingly necessary across industries. 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:** According to U.S. News & World report, in May 2021, a computer network architect’s median salary was \$120,520, based on a bachelor’s degree at entry level.

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.





# 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.

**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.



# 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.

**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.

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

# Engineering

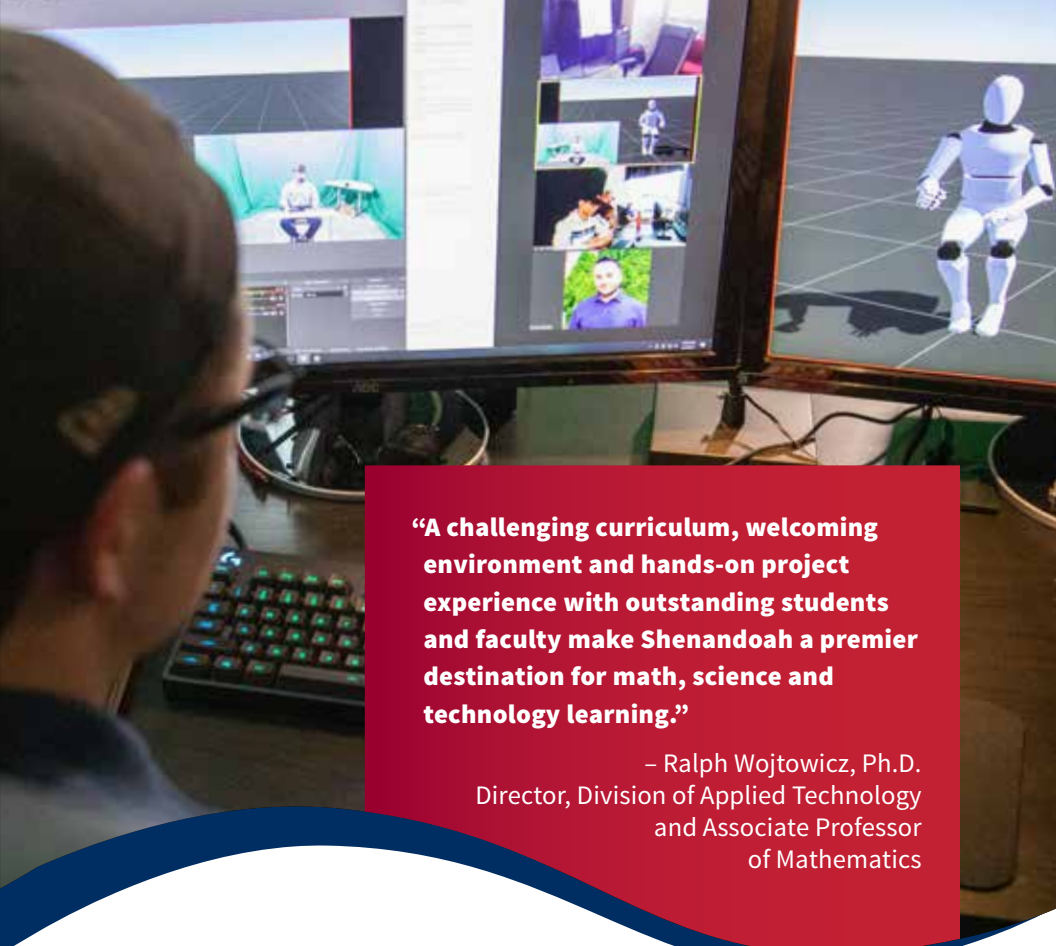
**The Bachelor of Science in Engineering** offers you the essential mathematical, scientific and real-world problem-solving skills you need to pursue a career in engineering.

All students in the engineering program complete a common core of courses in math, science and the fundamentals of engineering as well as select a focus in one of four specialized areas of study.

**The Engineering Core** provides the foundations necessary for all of the university's engineering concentrations and includes courses in linear algebra, calculus, computer programming, chemistry, differential equations, electronic interface design, engineering design, physics, and probability and statistics.

**The Computer Engineering concentration** provides a background for designing, analyzing, building and testing computer hardware and software components and systems. Courses include discrete mathematics, data structures, signal processing, digital system analysis and design, and computer architecture.

**The Engineering Physics concentration** focuses on the fundamental physical concepts and methods required for solving modern engineering problems. The six required courses are in computational physics, thermal physics, electrical circuits, classical mechanics, electricity and magnetism, and quantum mechanics.



**“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

### **The Simulation Engineering concentration**

combines computer engineering (hardware) and computer science (software design and development), which provides the skills necessary to create computational and graphical models and simulations of real-world systems and processes. Required coursework includes 3D modeling and design and development and programming in game engines.

**The Software Engineering concentration** focuses on the engineering concepts and methods required to design, develop, maintain, test and evaluate computer software systems. Courses include discrete mathematics, data structures, operating systems, software design, introduction to databases and programming languages.

**Job Outlook:** The average job growth rate for all engineers is projected to be approximately 5% between 2021 and 2031, according to the U.S. Bureau of Labor Statistics. The growth for a field served by this degree, such as software development, is higher, at 25% during the same time frame.



**Associate Professor & Director of Augmented Reality/Virtual Reality (BS) and Co-Director, Shenandoah Center for Immersive Learning (SCiL), 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.**

## 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 and 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.

**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.

## THE HONORS PROGRAM

The 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)

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

- 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*]

**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.



**“The Honors Program has enhanced my Information Technology degree by encouraging me to think more critically. Honors classes can involve answering questions that don’t have an obvious answer. This encourages interesting classroom discussions with different perspectives. The insight from classmates and professors has taught me as much as the course material itself.”**

*– Seth Griner '24  
Information Technology major,  
Psychology minor*

# SHENANDOAH'S DIVISION OF APPLIED TECHNOLOGY

- Shenandoah Center for Immersive Learning collaborated with SU Esports to create a 3D-printed trophy for the first Omega Strikers LAN tournament held after the game's release.
- The Hub for Innovators, Veterans and Entrepreneurs (HIVE) is transforming a historic armory building on main campus into a boundary-breaking technology hub and tech business magnet location.



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