

AMSE INSTITUTE

AMSE High School Program Catalog

2026/2027 AMSE AFTER SCHOOL PROGRAM OFFERINGS

High School Programs



<u>Aerospace</u>
Day & Time: Friday, 2:30 - 4:00 pm
Duration: Semester, August - November
Fee: $425

Launch into the exciting world of aerospace engineering! Students in this hands-on after-school program will learn about the origins of flight, the fundamentals of aerodynamics and how lift and drag actually work, how wing and airfoil design shape performance, how to analyze an airplane's climb, range, endurance, and speed, how aircraft achieve stability and control in the air, how engines — from propellers to rockets — generate thrust, and even get an introduction to space flight and the extreme world of hypersonic vehicles.

Through weekly hands-on activities and projects, students build core engineering skills — teamwork, problem-solving, and analysis — while exploring how engineers design, build, test, and evaluate aircraft and spacecraft.

This program is appropriate for both students who are exploring aerospace engineering for the first time and those seeking to deepen their understanding of the field. It provides an excellent foundation for future studies in aerospace engineering, aviation, physics, and related STEM fields.



Agri-BioTech
Day & Time: Wednesday, 3:10 - 4:30 pm
Duration: Semester, August - November
Fee - $475

Showcasing the intersection of agriculture and biotechnology with a focus on innovation.

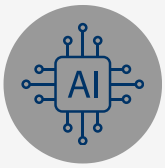
The Agri-Biotech program is a forward-thinking program designed to immerse students in the innovative intersection of agriculture, sustainability, and technology. With a strong focus on the engineering and design process, this program challenges students to both implement and invent tools that support sustainable agricultural practices.

Students will engage in hands-on study across several key areas:

- Biotechnology - Explore plant propagation by producing tissue cultures and understanding genetic applications in agriculture.
- Hydroponics - Experiment with altering chemical factors essential to plant growth, gaining insights into soil-less farming methods.
- Statistics & Data Analysis - Evaluate the efficiency of various plant production techniques, using data to drive improvements in agricultural methods.

Beyond technical skills, the program emphasizes the ecological impacts of agricultural technologies. Students investigate maintaining off-season plants efficiently and learn how to monitor, optimize, and use recorded data to grow plants that are off-season or from regions that are drastically different from our climate. These explorations build a holistic understanding of the scientific process and apply knowledge gained to real-life scenarios.

Each semester brings new, project-based learning opportunities, allowing both new and returning students to continuously expand their knowledge and skills. Whether you're interested in environmental science, project design, or any area of biology, the Agri-Biotech program offers a rich and rewarding educational experience.



Artificial Intelligence (AI) Level 1
Day & Time: Thursday, 2:45 - 4:45 pm
Duration: Semester, August - November
Fee - $650

The Artificial Intelligence (AI) Program at Valley Christian High School introduces students to the rapidly evolving field of AI through hands-on projects, collaborative challenges, and real-world applications. Students will explore the core principles of artificial intelligence, including machine learning, computer vision, natural language processing, and the ethical implications of AI technologies.

Throughout the program, participants will gain practical experience using industry-relevant AI tools and techniques while designing, building, and testing their own AI-powered solutions. Along the way, students will strengthen their computational thinking, creativity, collaboration, and problem-solving skills as they investigate how AI is transforming industries such as healthcare, engineering, business, and cybersecurity.

Whether students are new to artificial intelligence or looking to expand their knowledge, this program provides an engaging foundation for future study and innovation in one of today's fastest-growing fields.

In the second semester, we plan to offer a pilot program for AI Lab 2.



Forensic Discovery Lab

Day & Time: Monday, 2:45 - 4:00 pm
Duration: Semester, August - November
Fee - $350

The Forensic Discovery Lab is an empowering after-school program designed for high school students interested in science, criminal investigation, and problem-solving. Through hands-on activities and real-world case studies, students will learn the practical skills of forensic science, including fingerprint analysis, glass analysis, blood analysis, trace evidence, and crime scene investigation techniques. They will collaborate to solve mock crime scenes using scientific methods and critical thinking skills.

This engaging program not only introduces students to potential careers in forensic science and criminal justice, but it also enhances their analytical and laboratory skills in a fun, interactive environment.

The program complements the Forensic Science elective offered during the school day, providing unique content that does not repeat classroom instruction.

Additionally, the after-school program content for semesters one and two is different, and enrollment is open to all students.



Health & Wellness

Program Options: The Health & Wellness program offers four distinct tracks: **Physical Health, Mental Health, Emergency Medicine**, and our selection based **Global Health** program. Each track builds upon knowledge from the previous trimester, with the exception of Emergency Medicine, which is a non-repeatable course.



<u>Health & Wellness: Physical Health Trimester 1 & 2</u>
Day & Time: Thursday, 2:45 - 4:00 pm
Duration: Trimester 1, August - October
Duration: Trimester 2, November - January
Fee - $425
Sign up now for one or both trimesters

Health & Wellness: Physical Health - Trimester 1

The Physical Health Trimester 1 program, **History of Disease**, offers students an engaging exploration of medical topics related to physical health. This program focuses on understanding the human body in health and disease. Students will identify and explore the 11 major body systems and examine how they work together to maintain health and respond to disease.

Participants will study the history of significant historical diseases including plague, yellow fever, and cholera. Through interactive lessons, simulations, case studies, research projects, and laboratory activities students will learn how these conditions develop, spread, and are prevented or managed in modern healthcare.

Students will also investigate noninfectious diseases such as Celiac disease and examine its effects on the body. Designed to promote awareness of personal and public health, the program encourages critical thinking about the connections between science, medicine, history, and everyday wellness choices.

Returning students are welcome! This program features an updated curriculum with new activities, research investigations, and hands-on experiences, making it a valuable opportunity for both new and returning participants.

About Physical Health: Each trimester features its own unique curriculum and activities and can be taken independently—there is no requirement to complete them in sequence. Currently, you may choose to register for Trimester 1, Trimester 2, or both. The next opportunity to apply will be for Trimester 3, with applications opening in December.



Health & Wellness: Physical Health - Trimester 2

The Health & Wellness Physical Health Trimester 2 program, **Comparative Anatomy**, provides students with an in-depth, hands-on study of anatomical structures through the dissection and comparison of multiple species. Students will investigate how form relates to function across a range of organisms, gaining insight into adaptations, physiological systems, and biological diversity.

Through guided dissections, lab-based exploration, and collaborative analysis, students will examine major organ systems including the nervous, circulatory, respiratory, digestive, sensory, and reproductive systems while building a strong foundation in anatomical science and develop skills in observation, critical thinking, and scientific communication. Students will compare the anatomy of various individual organs as well as whole mammals and reptiles and analyze how anatomical differences reflect adaptations to different lifestyles and environments.

This program is ideal for students interested in medicine, veterinary science, biology, or health-related fields.

Returning students are welcome! This program features an updated curriculum with new activities, research investigations, and hands-on experiences, making it a valuable opportunity for both new and returning participants.

About Physical Health: Each trimester features its own unique curriculum and activities and can be taken independently—there is no requirement to complete them in sequence. Currently, you may choose to register for Trimester 1, Trimester 2, or both. The next opportunity to apply will be for Trimester 3, with applications opening in December.



<u>Health & Wellness: Mental Health - Trimester 1 & 2</u>
Day & Time: Thursday, 4:10 - 5:25 pm
Duration: Trimester 1, August - October
Duration: Trimester 2, November - January
Fee - $425
Sign up now for one or both trimesters

Health & Wellness: Mental Health - Trimester 1

The Mental Health Trimester 1 program, **Addiction, Memory, and Technology**, offers students an in-depth exploration of the brain-examining its structure, function, and the factors that influence behavior, decision-making, substance use, addiction, mental wellness and illness. Students will study brain anatomy and physiology, with a focus on key areas related to sensation, perception, the brain's reward circuit, emotional regulation, cognitive function, and behavioral health.

Throughout the program, students will engage in a variety of learning experiences, including hands-on activities, interactive labs, guest lectures, student-led mini research projects, and service initiatives. Students will investigate the physiology of addiction, analyze patterns of substance us and addictive behaviors, and examine the effects of commonly used substances, including nicotine, tobacco, vaping products, marijuana, opioids, stimulants, inhalants, and synthetic drugs on the brain and body.

In addition to gaining foundational knowledge in neuroscience and mental health, participants will develop essential leadership and collaboration skills. While not required, enrollment in the Emergency Medicine course is highly recommended to complement and deepen students' understanding of health science topics.

Returning students are welcome! This program features an updated curriculum with new activities, research investigations, and hands-on experiences, making it a valuable opportunity for both new and returning participants.

About Mental Health: Each trimester features its own unique curriculum and activities and can be taken independently—there is no requirement to complete them in sequence. Currently, you may choose to register for Trimester 1, Trimester 2, or both. The next opportunity to apply will be for Trimester 3, with applications opening in December.



Health & Wellness: Mental Health - Trimester 2

The Health & Wellness Mental Health Trimester 2 program, **How the Brain Learns**, is a comprehensive exploration of how neuroscience and learning intersect, offering insights into how the brain processes, retains, and recalls information.

The program will discuss scientific findings and apply them to practical strategies to improve learning. Specifically, the course will cover brain structure and function, memory systems, information processing, the role of emotion in learning, attention and learning, neuroplasticity and the windows of opportunity, the power of practice, reading and math, and the impact of mental health, sleep, and stress on learning.

Students will examine how brain development influences long-term learning and evidence-based strategies that support academic success and overall well-being.

Returning students are welcome! This program features an updated curriculum with new activities, research investigations, and hands-on experiences, making it a valuable opportunity for both new and returning participants.

About Mental Health: Each trimester features its own unique curriculum and activities and can be taken independently—there is no requirement to complete them in sequence. Currently, you may choose to register for Trimester 1, Trimester 2, or both. The next opportunity to apply will be for Trimester 3, with applications opening in December.



Health & Wellness: Emergency Medicine Trimester 1 or 2
Day & Time: Monday, 2:45 - 4:15 pm
Duration: Trimester 1, August - October
Duration: Trimester 2, November - February
Fee - $475
Not Repeatable

Students involved in Health and Wellness Emergency Medicine will be given the opportunity to learn how to save a life using the Red Cross of America curriculum. Knowing how to triage accident scenes, administer first aid, and do cardiopulmonary resuscitation (CPR) can sometimes make the difference between life and death.

Students will not only be taught first aid but also the background information to understand why the right course of action is best to take in an emergency. Using scenario-based training, students will learn to triage situations and treat the injuries, whether alone or with others.

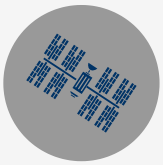
At the end of the program, students will earn First Aid certification from the Red Cross. Topics covered include the effective treatment of choking, heart attacks, sprains, strains, anaphylaxis, environmental emergencies, and leadership skills. The program fee includes Red Cross certification.

This course cannot be repeated. Attendance at all sessions is required for Red Cross certification.

Currently, you may choose to register for Trimester 1 OR Trimester 2. Do not register for both trimesters, as this program cannot be repeated.

The next opportunity to apply will be for Trimester 3, Wilderness Training, with applications opening in December.

Participating in Emergency Medicine does not count toward AMSE research project credit.



ISS Space Program
Day & Time: Monday and Wednesday, 3:35 - 5:00 pm
Duration: Semester, August - October
Fee - $700

Designed for students who are interested in space science. This fast-paced program meets twice weekly for eight weeks and includes 2-3 pre-designed experiments, multiple data uploads to the International Space Station, and the opportunity for data analysis. Students will analyze experiments around heat, radiation, conduction, and convection and compare the results on Earth and in micro-gravity. Students will receive guided instruction utilizing the Quest for Space kit.

This course fulfills the prerequisite for participation in the year-long ISS Research Lab program.

This course is a repeat of the same material taught in previous school years.

Returning students should not enroll in this program.



Math Team
Day & Time: Thursday - Lunch, Warrior Time, After school
Duration: Yearlong, August - April
Fee - $250

The Math Team provides students with the opportunity to further their math skills, as well as meet other people who share the same love and interest in math. Team members compete in local, national, and international competitions, and attend seminars.

Students will develop skills in collaboration and teamwork, improve their critical thinking, and expand their problem-solving strategies. Qualifying students can participate in the Mu Alpha Theta National Honor Society.

Math Team offers longer contests (60 minutes to 4 hours) after school or on weekends (dates TBD), and high school Math Team members can earn volunteer hours mentoring the junior high and elementary Math Teams.

WarriorTime may be utilized for competition test taking. This is optional for students, who may also test during lunch and after school. Warrior Time is also used for enrichment topics and problem solving (Warrior Time attendance is optional).



Research Fundamentals
Day & Time: Wednesday, 2:45 - 4:15 pm
Duration: Semester, August - November
Fee - $675

Step into the world of modern biotechnology and experience the techniques used in professional life science laboratories. In this hands-on program, students will develop foundational laboratory skills while learning to culture mammalian cells and conduct an authentic scientific investigation.

Throughout the program, students will learn proper laboratory safety procedures, master aseptic techniques, and become proficient with essential scientific equipment. Using non-pathogenic CHO-K1 mammalian cells, students will observe cell growth, collect and analyze biological data, and explore how cell culture is used in biomedical research, biotechnology, and pharmaceutical development.

As the program progresses, students will design a mini research investigation, interpret experimental results, and present their scientific findings, gaining valuable experience in both laboratory techniques and scientific communication.

Students will:

- Learn proper laboratory safety protocols and BSL-1 laboratory practices.
- Identify and correctly use common life science laboratory equipment.
- Develop sterile (aseptic) laboratory techniques.
- Culture and observe mammalian CHO-K1 cells.
- Collect, graph, and analyze biological data.
- Design and conduct a guided research investigation.
- Present scientific findings using professional research practices.

This program is ideal for students interested in biology, biotechnology, biomedical engineering, medicine, or scientific research and provides an excellent foundation for more advanced laboratory experiences.



RoboQuest
Day & Time: Friday, 2:15 - 5:15 pm
Duration: Yearlong, August - April
Fee - $850

RoboQuest Robotics focuses on developing skills in the areas of software, mechanical engineering, electrical engineering, and computer-aided design (CAD). This yearlong course in STEM robotics uses a hands-on approach to introduce fundamental robotics concepts, focusing on the construction and programming of individual robots.

Students will learn programming skills, problem-solving strategies, and have the opportunity to design, build, and compete with individualized bots utilizing the Quest Institute's proprietary program.

RoboQuest students will have the opportunity to compete in a District tournament, hosted at VCS.

Repeat students welcome.