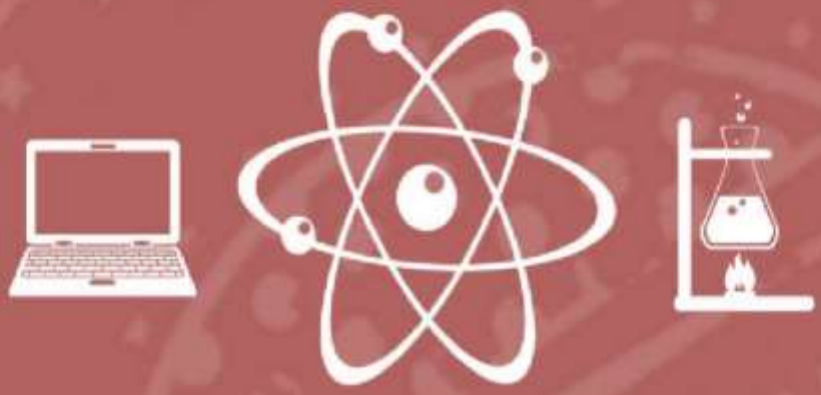


# STEM

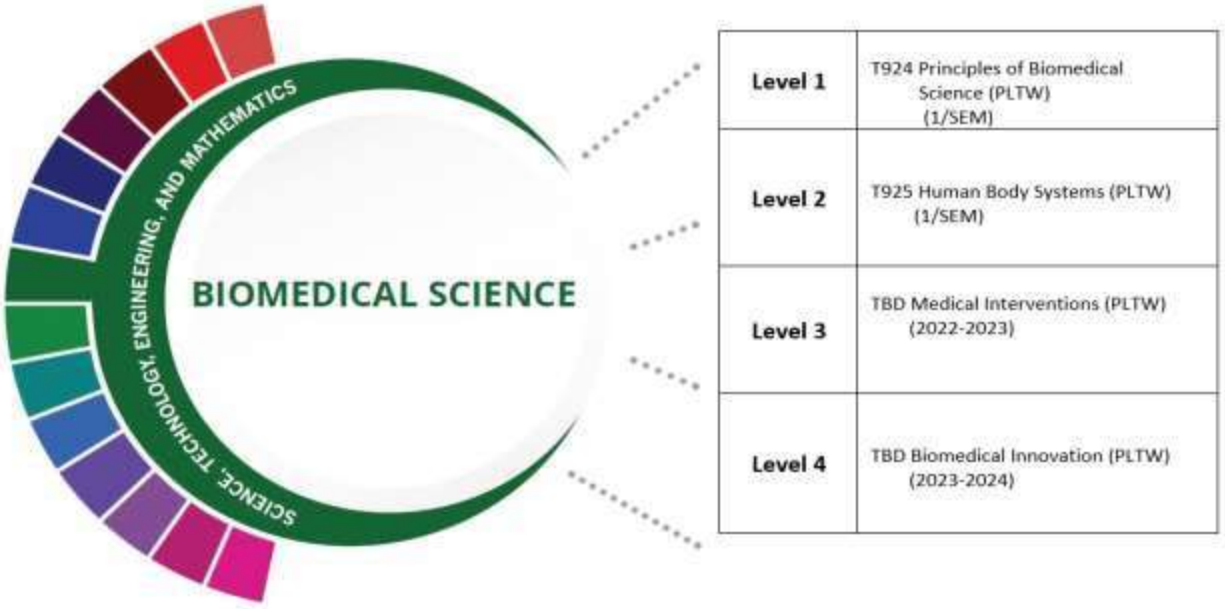
## ENDORSEMENT


**Project Lead The Way® (PLTW)** promotes pre-engineering courses for high school students. PLTW forms partnerships with public schools, higher education institutions and the private sector to increase the quantity and quality of engineers and engineering technologists graduating from our educational system. Students take a sequence of courses which introduces students to the scope, rigor and discipline of engineering prior to entering college. All students will benefit from the knowledge and logical thought processes that result from taking some or all of the courses provided in the curriculum. Visit for more information.

*Students who meet certain criteria when completing the PLTW courses will be able to apply for college credit. These courses are math and science intensive. PLTW courses must be completed in sequence and are math and science intensive*

# SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS CAREER CLUSTER

The Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing, scientific research and professional and technical services, including laboratory and testing services, and research and development services. **JISD offers the following programs of study: Biomedical Science, Cybersecurity, and Engineering, Programming Software Development-(Computer Science).**




## Biomedical Science
### Project Lead the Way (PLTW)
### Program of Study (WHS)

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|---|---|---|
| **T924 PRINCIPLES OF BIOMEDICAL SCIENCE N1302092** | **Semester (18 Weeks)**<br><br>**Grade 9**<br>**Credit 1**<br>**Weight 1.0** | In the introductory course of the PLTW Biomedical Science program, students explore concepts of biology and medicine to determine factors that led to the death of a fictional person. While investigating this case, students examine autopsy reports, investigate medical history, and explore medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, basic biology, medicine, and research processes while allowing them to design their own experiments to solve problems. |

| | | |
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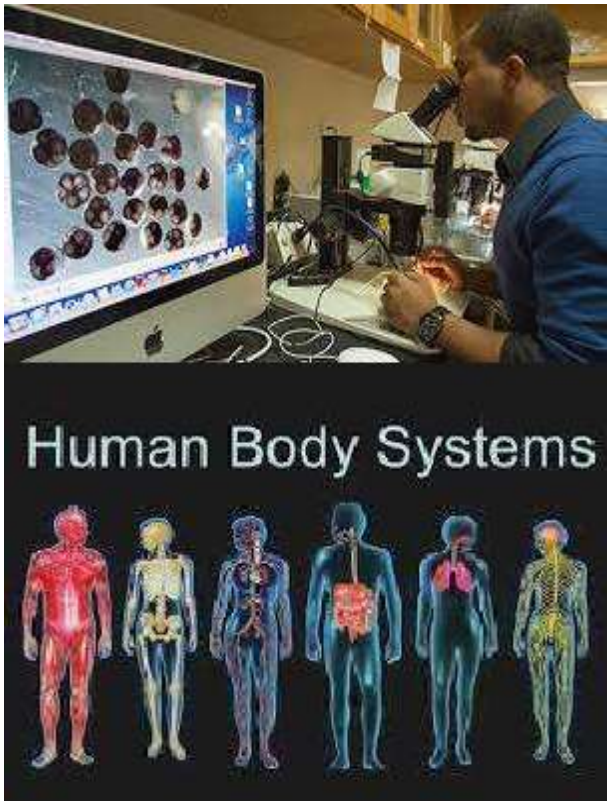
| **T925 HUMAN BODY SYSTEMS N1302093** | **Semester (18 Weeks)**<br><br>**Grade 9**<br>**Credit 1**<br>**Weight 1.0** | Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis in the body. Exploring science in action, students build organs and tissues on a skeletal mannequin; use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration; and take on the roles of biomedical professionals to solve real-world medical cases. ***Prerequisite: Principles of Biomedical Science*** |
| **TBD MEDICAL INTERVENTIONS N1302094** | **Semester (18 Weeks)**<br><br>**Grade 11-12**<br>**Credit 1**<br>**Weight 1.0** | Through real-world cases, students are exposed to range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. *(available in 2022-2023)* ***Prerequisite: Human Body Systems*** |
| **TBD BIOMEDICAL INNOVATION N1302095** | **Semester (18 Weeks)**<br><br>**Grade 11-12**<br>**Credit 1**<br>**Weight 1.0** | In the final course of the PLTW Biomedical Science sequence, students build on the knowledge and skills gained from previous courses to design innovative solutions for the most pressing health challenges of the 21st century. Students address topics ranging from public health and biomedical engineering to clinical medicine and physiology. They have the opportunity to work on an independent project with a mentor or advisory from a university, medical facility, or research institution. ***Prerequisite: Medical Interventions*** *(available in 2023 -2024)* |

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|---|---|
| **Level 1** | T365 Foundations of Cybersecurity (1/SEM) |
| **Level 2** | T346 Computer Maintenance/Lab (2/YL) |
| **Level 3** | T340 Networking/Lab (2/LY) |
| **Level 4** | T363 Practicum in Information Technology (2/LY) |
| ***Certifications:*** CompTIA A+, Network+, Security+, and IT Fundamentals | |

# Cybersecurity
# Program of Study (VMHS)

| | | |
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| **T365 FOUNDATIONS OF CYBERSECURITY 03580850** | **Semester (18 Weeks)**<br><br>**Grade 9**<br>**Credit 1**<br>**Weight 1.0** | Students in the Foundations of Cybersecurity course develop the knowledge and skills needed to master fundamental concepts of cybersecurity by exploring challenges facing information security professionals related to ethics, system security, network security, and application security. Students will examine trends in cyber-attacks, common vulnerabilities, and the emergence of cyber terrorism. Students will develop and implement security policies to mitigate those risks. To prepare for success, students will have opportunities to apply, reinforce, and transfer knowledge and skills to a variety of settings and problems. |
| **T346 COMPUTER MAINTENANCE/LAB 13027310** | **Yearlong (36 Weeks)**<br><br>**Grade 10-11**<br>**Credit 2**<br>**Weight 1.0** | In Computer Maintenance Lab, students will acquire knowledge of computer maintenance and creating appropriate documentation. Students will analyze the social responsibility of business and industry regarding the significant issues relating to the environment, ethics, health, safety, and diversity in society and in the workplace as related to computer maintenance. Students will apply technical skills to address the IT industry and emerging technologies. ***Prerequisite: Foundations of Cybersecurity, or Information Technology*** |
| **T340 NETWORKING/ LAB 13027410** | **Yearlong (36 Weeks)**<br><br>**Grade 10-11**<br>**Credit 2**<br>**Weight 1.0** | In Networking Lab, students will develop knowledge of the concepts and skills related to telecommunications and data networking technologies and practices to apply them to personal or career development. To prepare for success, students must have opportunities to reinforce, apply, and transfer knowledge and skills to a variety of settings and problems. This course must be taken concurrently with Networking and may not be taken as a stand-alone course. Districts are encouraged to offer this course in a consecutive block with Networking to allow students sufficient time to master the content of both courses. ***Prerequisite: Computer Maintenance/ Lab*** |

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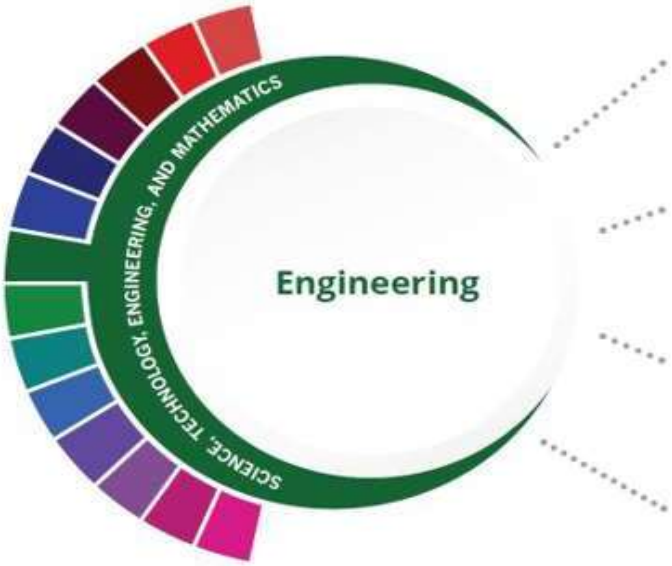
| **T363 PRACTICUM IN INFORMATION TECHNOLOGY 13028000** | **Yearlong (36 Weeks)**<br><br>**Grade 10-11**<br>**Credit 2**<br>**Weight 1.0** | In the Practicum in Information Technology, students will gain advanced knowledge and skills in the application, design, production, implementation, maintenance, evaluation, and assessment of products, services, and systems. Knowledge and skills in the proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an industry mentor, as an unpaid or paid internship, as part of a capstone project, or as career preparation. ***Prerequisite: A minimum of two high school information technology (IT) courses.*** |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|---|---|
| **Level 1** | T913 Engineering Essentials (PLTW) (1/SEM) |
| **Level 2** | T912 Introduction to Engineering Design (PLTW) (1/SEM) |
| **Level 3** | T920 Computer Integrated Manufacturing (PTLW) (1/YL) *or* T919 Aerospace Engineering (PLTW) (1/YL) |
| **Level 4** | T914 Practicum in STEM (2/YL) *or* Level 3 course not yet taken |
| ***Certifications: Adobe Autodesk Inventor Auto Desk Revit*** | |

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# Engineering - Project Lead the Way
# Program of Study (WHS)

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| **T913 (PLTW) ENGINEERING ESSENTIALS N1303760** | **Semester (18 Weeks)**<br><br>**Grade 9**<br>**Credit 1**<br>**Weigh 1.0** | Students explore the breadth of engineering career opportunities and experiences as they solve engaging and challenging real-world problems like creating a natural relief center system or creating a solution to improve the safety and well-being of local citizens. ***Prerequisite: Successful completion of Algebra I or concurrently enrolled*** |
| **T912 (PLTW) INTRODUCTION TO ENGINEERING DESIGN (IED) N1303742** | **Semester (18 Weeks)**<br><br>**Grade 10-11**<br>**Credit 1**<br>**Weight 1.0** | Advanced math and science problem solving skills are used in various design applications throughout this course. Students explore the design development process of a product and how a model of that product is produced, analyzed and evaluated using freehand sketching methods and state-of-the-art Computer Aided Design software. Students develop the concept of creating 3-D models or solid rendering of a model. ***Prerequisite: Successful completion of Algebra I or concurrently enrolled*** |
| **T920 (PLTW) COMPUTER INTEGRATED MANUFACTURING (CIM) N1303748** | **Yearlong (36 Weeks)**<br><br>**Grade 10-11**<br>**Credit 1**<br>**Weight 1.0** | Advanced math and science problem solving skills are used in various design applications throughout this course. Computer integrated manufacturing utilizes the principals developed in introduction to engineering design. Students use automation, control systems sensing devices, computer programming and robotics to produce products. The course emphasizes trouble shooting and design efficiency***. Prerequisites: Introduction to Engineering Design and physics*** |

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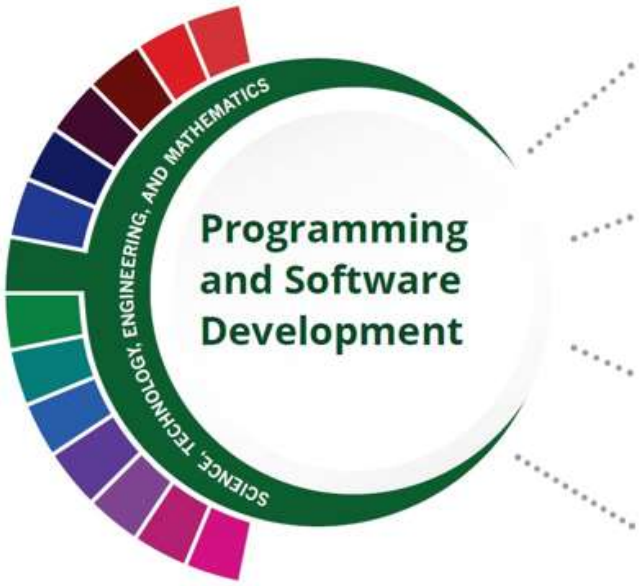
| **T919 (PLTW) AEROSPACE ENGINEERING (AE) N1303745** | **Yearlong (36 Weeks)**<br><br>**Grade 11-12**<br>**Credit 1**<br>**Weight 1.0** | Advanced math and science problem solving skills are used in various design applications throughout this course. This course propels students' learning in the fundamentals of atmospheric and space flight. As they explore the physics of flight, students bring concepts to life by designing an airfoil, propulsion system and rockets. They learn basic orbital mechanics using industry-standard software. They also explore robot systems through projects such as remotely operated vehicles. ***Prerequisite: Introduction to Engineering Design and physics*** |
| **T914 PRACTICUM IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS 13037400** | **Yearlong (36 Weeks)**<br><br>**Grade 11-12**<br>**Credit 2**<br>**Weight 1.0** | The course is designed to give students supervised practical application of previously studied knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience ***Prerequisites: Introduction to Engineering Design, and one other STEM Course, a sequence of three credits in the STEM cluster***. |

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|---|---|
| **Level 1** | T909 Fundamentals of Computer Science (1/SEM) |
| **Level 2** | T347R Computer Science I (1/SEM)<br>*or*<br>T349A AP Computer Science Principles (1/SEM)<br>*and*<br>T349C Independent Study (1/SEM) |
| **Level 3** | T348R Computer Science II (1/SEM)<br>*or*<br>T348A AP Computer Science A (1/SEM)<br>*and*<br>T348AC Independent Study (1/SEM) |
| **Level 4** | T349R Computer Science III (1/SEM)<br>*or*<br>T362 Practicum in Information Technology (2/YL) |
| ***Certifications:*** Oracle Certified Associate, Microsoft Technology Associate, Intro to Programming Using Java or Java Script | |

## Program and Software Development – Computer Science
## Program of Study (WHS, VMHS)

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|---|---|---|
| **T909 FUNDAMENTALS OF COMPUTER SCIENCE**<br>**03580140**<br><br>***(WHS)*** | **Semester (18 Weeks)**<br><br>**Grade 9**<br>**Credit 1**<br>**Weight 1.0** | Fundamentals of Computer Science is intended as a first course for those students just beginning the study of computer science. Students will foster their creativity and innovation through opportunities to design, implement, and present solutions to real-world problems. Students will collaborate and use computer science concepts to access, analyze, and evaluate information needed to solve problems. Students will learn the problem-solving and reasoning skills that are the foundation of computer science |
| **T347R COMPUTER SCIENCE I**<br>**03580200** | **Semester (18 Weeks)**<br><br>**Grade 9-12**<br>**Credit 1**<br>**Weight 1.0** | In this course students, will identify task requirements, plan search strategies, and use computer science concepts to access, analyze, and evaluate information needed to solve problems. By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. ***Prerequisite: Algebra 1*** |
| **T348R COMPUTER SCIENCE II**<br>**03580300** | **Semester (18 Weeks)**<br><br>**Grade 10-12**<br>**Credit 1**<br>**Weight 1.0** | In this course students, will identify task requirements, plan search strategies, and use computer science concepts to access, analyze, and evaluate information needed to solve problems. By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. ***Prerequisite: Algebra 1, Computer Science 1, or Fundamentals of Computer Science.*** |

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|---|---|---|
| **T349R COMPUTER SCIENCE III 03580350** | **Semester (18 Weeks)**<br><br>**Grade 10-12 Credit 2 Weight 1** | By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of advanced computer science data structures through the study of technology operations, systems, and concepts***. Prerequisite: AP Computer Science A*** |
| **T349A AP COMPUTER SCIENCE PRINCIPLES A3580300** | **Semester (18 Weeks)**<br><br>**Grade 9-12 Credit 1 Weight 1.2** | In this course, you will learn the computing skills needed to collaborate with peers to solve real world problems you are passionate about—from simple games and apps to programs that can analyze large data sets or inspire the creation of visual art and music. Students will collaborate on designing computing solutions to solve real-world problems that they care about. Students will use their creativity to develop hands-on projects throughout the school year |
| **T349AC1 03580900**<br>**T349AC2 03581000**<br><br>**INDEPENDENT STUDY IN TECHNOLOGY APPLICATIONS**<br><br>**T348AC1 03580900**<br>**T348AC2 03581000** | **Semester (18 Weeks)**<br><br>**Grade 9-12 Credit 1 Weight 1.0** | In Independent Study in Technology Applications, through the study of technology applications foundations, including technology-related terms, concepts, and data input strategies, students will communicate information in different formats and to diverse audiences using a variety of technologies. Students will learn to make informed decisions; develop and produce original work that exemplifies the standards identified by the selected profession or discipline; and publish the product in electronic media and print. Students will practice the efficient acquisition of information by identifying task requirements, using search strategies, and using technology to access, analyze, and evaluate the acquired information. |
| **T348A AP COMPUTER SCIENCE A (Math) A3580110**<br><br>**T348A2 AP COMPUTER SCIENCE (LOTE) A3580120** | **Semester (18 Weeks)**<br><br>**Grade 9-12 Credit 2 Weight 1.2** | In this course students will identify task requirements, plan search strategies, and use computer science concepts to access, analyze, and evaluate information needed to solve problems. By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. |
| **T362 PRACTICUM IN INFORMATION TECHNOLOGY (FIRST TIME TAKEN) 13028000** | **Yearlong (36 Weeks)**<br><br>**Grade 11-12 Credit 2 Weight 1.0** | In the Practicum in Information Technology, students will gain advanced knowledge and skills in the application, design, production, implementation, maintenance, evaluation, and assessment of products, services, and systems. Knowledge and skills in the proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an industry mentor, as an unpaid or paid internship, as part of a capstone project, or as career preparation***. Prerequisite: A minimum of two high school information technology (IT) courses.*** |

# ALAMO ACADEMIES

## THE FUTURE OF EDUCATION FOR TODAY'S STUDENTS

AEROSPACE ACADEMY

INFORMATION TECHNOLOGY & SECURITY ACADEMY

ADVANCED TECHNOLOGY & MANUFACTURING ACADEMY

DIESEL TECHNOLOGY ACADEMY

HEALTH PROFESSIONS ACADEMY

## ABOUT ALAMO ACADEMIES

Alamo Academies provides education, experience, and job opportunities for high school sophomores looking to advance their future before high school graduation. In partnership with Alamo Colleges and industry partners, Alamo Academies offers training and internship programs that introduce students to career opportunities in key industries while supporting a seamless transition from high school to college to the workplace.

## BENEFITS

### Career Options

Explore careers in the aerospace, information technology, advanced manufacturing, allied health and diesel technology industries right here in San Antonio.

### Free College Tuition and Credit

Earn 30+ hours of college semester credit leading to a certificate of completion from Alamo Colleges.

### Paid Summer Internship

Summer internships within the industry provide real-world experience. Students earn up to $3,000 between their junior and senior year.

### Work Experience

Graduate from high school with specific, high-tech skills and valuable experience that translate into higher pay.

- 2-YEAR PROGRAM OF STUDIES
- 30+ HOURS COLLEGE DUAL CREDIT
- PAID SUMMER INTERNSHIP
- MULTIPLE INDUSTRY CERTIFICATIONS
- CLASSES AT ALAMO COLLEGES
- EQUAL TO $12,000 SCHOLARSHIP

https://alamoacademies.com

| Cybersecurity Program of Study (ITSA) | | | | | | |
|---|---|---|---|---|---|---|
| JISD Course # | High School Course | TEA ID | HS Credit | Semester | College | College |
| ITSA Year One | | PEIMS | 6 | Section | Course | Hurs |
| T352DA | Computer Maintenance/Lab | 13027310 | 2 | 1st,2nd Per Fall | ITSA 1305 | 3 |
| T340DA | Networking/Lab | 13027410 | 2 | 1st,2nd Per Spring | ITSA 1425 | 4 |
| | | | | | ITNW 1425 | 4 |
| | | | | | ITSA 2439 | 4 |
| | | | | | Total | 15 |
| ITSA Year Two | | | | | | |
| T354DA | Practicum in Information Technology | 13028005 | 3 | 1st, 2nd double bk Yearlong (1.5) per semester | ITSC 1316 | 3 |
| | | | | | ITSY 1342 | 3 |
| | | | | | ITSE 1302 | 3 |
| | | | | | ITSE1311 | 3 |
| | | | | | Total | 12 |

## Cybersecurity Program of Study

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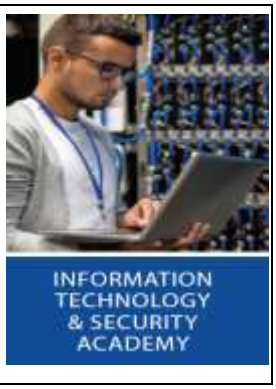
| **Information Technology & Security Academy (ITSA)** | **Yearlong (36 Weeks)**<br><br>**Grade 11-12**<br>**Weight 1.1** | This program is designed to provide high school students with knowledge and skills in the area of information technology computer security, web development and programming and offers opportunities for paid summer internships with one of the industry partners. Graduates of this program will be prepared for entry-level Information Technology positions or for post-secondary Information Technology course of study.<br>***** Leads to jobs in Information Technology/Security & Assurance*** |  |

# Career and Technical Student Organizations

Career and Technical Student Organizations (CTSOs) play an integral part in a student's career and technical Education CTSOs enrich student learning that starts in the classroom, build strong partnerships between industries and future employees, and provide future career experience that students carry into their careers and communities. https://txcte.org/teachers. ***Student CTSO membership requires student enrollment in the respective pathway.***

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| | **Business Professionals of America (BPA)**<br>Members compete in demonstrations of their business technology skills, develop their professional and leadership skills, network with one another and professionals across the nation, and get involved in the betterment of their community through good works projects. |
| | **DECA**,<br>A national association of marketing education students, provides teachers and members with educational and leadership development activities to merge with the education classroom instructional program. DECA prepares emerging leaders and entrepreneurs in marketing, finance, hospitality and management in high schools and colleges around the globe. |
| | **Family Career and Community Leaders of America (FCCLA)**<br>Involvement in FCCLA offers members the opportunity to expand their leadership potential and develop skills for life — planning, goal setting, problem solving, decision-making and interpersonal communication — necessary in the home and workplace |
| | **Health Occupations Students of America (HOSA)**<br>HOSA is a national vocational student organization endorsed by the U.S. Department of Education and the Health Occupations Education Division of the American Vocational Association. HOSA's two-fold mission is to promote career opportunities in the health care industry and to enhance the delivery of quality health care to all people. HOSA's goal is to encourage all health occupations instructors and students to join and be actively involved in the HOE-HOSA Partnership |
| | **National Future Farmers of America (FFA)**<br>The National Future Farmer of American organization is not just for students who want to be production famers, FFA also welcomes members who aspire to careers in other fields. The Nation FFA organization remains committed to the individual student, providing a path to achievement in premier leadership, personal growth and career success through agricultural education. |
| | **SkillsUSA**<br>SkillsUSA is a national organization serving high school and college students and professional members who are enrolled in technical, skilled and service occupations, including health occupations. |
| | **TAFE**<br>The Texas Association of Future Educators is a statewide student organization created to allow young men and women an opportunity to explore the teaching profession. The organization provides students the necessary knowledge to make informed decisions about pursuing careers in education. |
| | **Texas Public Service Association (TPSA)**<br>Texas Public Service Association was developed to help high school Law Public Safety, Corrections, Security students experience interaction with other students and working professionals in an effort to pinpoint their future career expectations through competition and education. |

# Glossary

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| **Career Clusters** | This is a grouping of course sequences (programs of study) that prepare students for careers in the same field of study or that require similar skills. |
| **Course Credit** | A unit of measure awarded for Successful completion of a course. Completion of a one semester course typically earns one-half credit for a student. |
| **Coherent Sequence** | A series of courses in which vocational and academic education are integrated, and which directly relates to, and leads to, both academic and occupational competencies. |
| **CTE Courses** | These courses prepare students for careers. These were once called vocational courses. The CTE stands for Career and Technical Education. |
| **Distinguished Level of Achievement** | A high level of academic achievement earned by going above and beyond the Foundation + Endorsement high school program. A student must earn this designation to be eligible for the top 10 percent automatic admission to a Texas public university. |
| **Endorsements** | The areas of specialized study that are required to earn high school diplomas with endorsements. They are: STEM (Science, Technology, Engineering, & Math), Business & Industry, Arts & Humanities, Public Service, and Multidisciplinary Studies. |
| **EOC** | STAAR end-of-course (EOC) exams are state mandated tests given during the final weeks of a course. In addition to meeting graduation course requirements, students are required to pass five end- of-course exams to earn a diploma from a Texas public high school. Those five exams are given when a student takes English I and II, Biology, Algebra I, and U.S. History courses. |

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| **Foundation High School Program** | The basic 22-credits (not counting additional electives or endorsement courses) needed to graduate from the Texas public school system. |
| **FAFSA** | This is the federal student financial aid application. It stands for Free Application for Federal Student Aid. |
| **Industry Workforce Credential** | A state, nationally, or internationally-recognized credential that aligns with the knowledge and skills standards identified by an association or government entity representing a particular profession or occupation and valued by business or industry. |
| **Programs of Study** | Programs of Study provides students with course sequences that prepare them for success in in-demand, high wage, high skill careers. |
| **Performance Acknowledgements** | Students may earn an additional acknowledgement on their diploma because of outstanding performance in areas such as dual credit courses and bilingualism and bi-literacy; on Advanced Placement (AP) exams, International Baccalaureate, PSAT, ACT's Plan, the SAT or ACT exams, or by earning a nationally or internationally-recognized business or industry certification. |
| **STAAR** | State of Texas Assessments of Academic Readiness (STAAR) is the state-mandated test given annually to students in grades 3 – 8 and in five high school courses. |