

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.

Biomedical Science *Statewide Program of Study*



The Biomedical Science program of study focuses on the study of biology and medicine in order to introduce CTE learners to the knowledge and skills necessary to be successful in the healthcare field, such as researching and diagnosing diseases, pre-existing conditions, or other determinants of health. Students may also practice patient care and communication.

Cybersecurity *Statewide Program of Study*



The Cybersecurity program of study includes the occupations and educational opportunities related to planning, implementing, upgrading, or monitoring security measure for the protection of computer networks and information. This program of study may also include exploration into responding to computer security breaches and virus and administering network security measures.

Engineering *Statewide Program of Study*



The Engineering program of study focuses on the design, development, and use of engines, machines, and structures. CTE learners will learn how to apply science, mathematical methods, and empirical evidence to the innovation, design, construction, operation, and maintenance of different manufacturing systems.

Programming and Software Development *Statewide Program of Study*



The Programming and Software Development program of study explores the occupations and education opportunities associated with researching, designing, developing, and testing operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computer applications. This program of study may also include exploration into creating, modifying, and testing the codes, forms, and script that allow computer applications to run.

Renewable Energy & Mechatronics *Statewide Program of Study*



The Renewable Energy & Mechatronics program of study helps CTE learners discover to assemble, inspect, maintain, and repair different equipment required for renewable energy. It introduces students to solar photovoltaic equipment and wind turbines, the systems and processes used to maintain and manage these types of equipment, and helps students develop the skills needed to do so.

Successful completion of the Biomedical program of study will fulfill requirements of the Public Service or STEM endorsement if the math and science requirements are met. Revised – October 2022

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Biomedical Sciences

Statewide Program of Study

The Biomedical Science program of study focuses on the study of biology and medicine in order to introduce CTE learners to the knowledge and skills necessary to be successful in the healthcare field, such as researching and diagnosing diseases, pre-existing conditions, or other determinants of health. Students may also practice patient care and communication.

Secondary Courses for High School Credit

Level 1

Currently there are no level one classes in Biomedical Science

Level 2

8O790 MST Biotechnology I

Level 3

8H740 MST Medical Microbiology

Level 4

8H770 MST Pathophysiology

8O713 MST Scientific Research and Design

**Level 3 and Level 4 are Advanced CTE Courses
MST is only offered at North Garland High School**

Postsecondary Opportunities

Associates Degrees

- Histologic Technician
- Clinical Laboratory Science/Medical Technology/Technologist

Bachelor's Degrees

- Biomedical Engineers
- Clinical Laboratory Science/Medical Technology/Technologist

Master's, Doctoral, and Professional Degrees

- Genetic Counseling
- Medical Scientists
- Epidemiology

Work-Based Learning and Expanded Learning Opportunities

| Exploration Activities | Work-Based Learning Activities |
|---|--|
| <ul style="list-style-type: none"> • Join Health Occupations Students of America | <ul style="list-style-type: none"> • Intern at a lab • Shadow a healthcare or medical professional |

Industry-Based Certifications

- Medical Laboratory Assistant



Aligned Occupations

| Occupations | Median Wage | Annual Openings | % Growth |
|---|-------------|-----------------|----------|
| Medical and Laboratory Technicians | \$37,981 | 1,159 | 28% |
| Biological Technicians | \$42,931 | 452 | 17% |
| Forensic Science Technicians | \$48,152 | 171 | 35% |
| Chemical Technicians | \$49,733 | 672 | 10% |
| Medical and Clinical Laboratory Technologists | \$58,760 | 1,166 | 35% |

Successful completion of the Biomedical program of study will fulfill requirements of the Public Service or STEM endorsement if the math and science requirements are met. Revised – October 2022

Biomedical Science

Course Information

Level 1

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|-------------|------------|---------------|-------|
| None | | | |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---------------------------|---------------------|---------------|-------|
| 80790 MST Biotechnology I | 13036400 (1 credit) | Biology | 10-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--------------------------------|---------------------|-----------------------|-------|
| 8H740 MST Medical Microbiology | 13020700 (1 credit) | Biology and Chemistry | 11-12 |

Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|---------------------|---|-------|
| 8H770 MST Pathophysiology | 13020800 (1 credit) | Biology and Chemistry | 11-12 |
| 80713 MST Scientific Research and Design | 13037200 (1 credit) | Biology, Chemistry, Integrated Physics and Chemistry (IPC) or Physics | 11-12 |

Level 3 and Level 4 are Advanced CTE Courses
MST is only offered at North Garland High School



Cybersecurity

Statewide Program of Study

The Cybersecurity program of study includes the occupations and educational opportunities related to planning, implementing, upgrading, or monitoring security measure for the protection of computer networks and information. This program of study may also include exploration into responding to computer security breaches and virus and administering network security measures.

Secondary Courses for High School Credit

Level 1

- 80056 (Middle School) Fundamentals of Computer Science
- 8K100, 8K105DC, 8K700 MST Principles of Information Technology
- 8O140 Foundations of Cybersecurity

Level 2

- 8O110 Computer Science I
- 8O130 AP Computer Science Principles
- 8K906S GRCTC, 8K907S GRCTC Computer Maintenance

Level 3

- 8K930S GRCTC, 8K935S DC GRCTC Networking

Level 4

- 8O985DC (GRCTC) Fall Cybersecurity Capstone and
- 8O995DC (GRCTC) Spring Project-Based Research - Cybersecurity

**Level 3 and Level 4 are Advanced CTE Courses
GRCTC is only offered at GRCTC**

Postsecondary Opportunities

Associates Degrees

- System Networking, and LAN/WAN Management
- Information Technology
- Computer and Information Sciences, General
- Computer Science

Bachelor's Degrees

- Computer Systems Networking and Telecommunications
- Computer Systems Networking and Telecommunications
- Computer and Information Sciences, General
- Computer Science

Master's, Doctoral, and Professional Degrees

- Computer Systems Analysis/Analyst
- Information Technology
- Computer Information Sciences, General
- Computer Science

Work-Based Learning and Expanded Learning Opportunities

| Exploration Activities | Work-Based Learning Activities |
|--|--|
| <ul style="list-style-type: none"> Join TSA Job shadow a computer system analyst or information security analyst | <ul style="list-style-type: none"> Obtain a cybersecurity IBC |

Industry-Based Certifications

- CompTIA A+ Certification
- IT Fundamentals (ITF+)



Aligned Occupations

| Occupations | Median Wage | Annual Openings | % Growth |
|--|-------------|-----------------|----------|
| Information Security Analysts | \$91,915 | 814 | 29% |
| Network and Computer System Administrators | \$82,597 | 2,814 | 19% |
| Computer System Analysts | \$87,568 | 5,937 | 29% |

Successful completion of the Agribusiness program of study will fulfill requirements of the Business and Industry or STEM Endorsement if this math and science requirements are met. Revised – October 2022

Cybersecurity Course Information

Level 1

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|---------------|-------|
| 8O056 (Middle School) Fundamentals of Computer Science | 03580140 (1 credit) | None | 8 |
| 8K100, 8K105DC, 8K700 MST Principles of Information Technology | 13027200 (1 credit) | None | 9-10 |
| 8O140 Foundations of Cybersecurity | 03580850 (1 credit) | None | 9-10 |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|--------------------------|-------|
| 8O110 Computer Science I | 03580200 (1 credit) | Algebra I | 9-12 |
| 8O130 AP Computer Science Principles | A3580300 (1 credit) | Algebra I | 9-12 |
| 8K906S GRCTC, 8K907S DC GRCTC Computer Maintenance | 13027300 (1 credit) | Principles of Technology | 10-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|---------------|-------|
| 8K930S GRCTC, 8K935S DC GRCTC Networking | 13027400 (1 credit) | None | 11-12 |

Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|---------------------|------------------------------|-------|
| 8O985DC (GRCTC) Fall Cybersecurity Capstone | 03580855 (1 credit) | Foundations of Cybersecurity | 11-12 |
| 8O995DC (GRCTC) Spring Project-Based Research - Cybersecurity | 12701500 (1 credit) | Cybersecurity Capstone | 12 |

Level 3 and Level 4 are Advanced CTE Courses
GRCTC is only offered at GRCTC



Engineering

Statewide Program of Study

The Engineering program of study focuses on the design, development, and use of engines, machines, and structures. CTE learners will learn how to apply science, mathematical methods, and empirical evidence to the innovation, design, construction, operation, and maintenance of different manufacturing systems.

Secondary Courses for High School Credit

Level 1

- 80100 Principles of Applied Engineering
- 80740MST (PLTW) MST Introduction to Eng. Design

Level 2

Level 3

- 80230 Engineering Design and Presentation I
- 80716 MST Engineering Science
- 80750 (PLTW) Civil Engineering and Architecture
- 80760MST (PLTW) MST Aerospace Engineering
- 80770 (PLTW) MST Computer Integrated Manufacturing
- 80780 (PLTW) Engineering Design & Development

Level 4

- 80310, 80730 MST Engineering Design and Problem Solving
- 80340 Scientific Research and Design
- 80960 (GRCTC) Engineering Design and Presentation II
- 80970 (GRCTC) Practicum in Science, Technology, Engineering and Math

Level 3 and Level 4 are Advanced CTE Courses

MST classes offered only at North Garland HS

PLTW classes offered only at North Garland HS

Postsecondary Opportunities

Associates Degrees

- Electrical and Electronics Engineering
- Drafting and Design Technology/ Technician, General
- Engineering Technology

Bachelor's Degrees

- Electrical and Electronics Engineering
- CAD/CADD Drafting and/or Design Technology/ Technician
- Bioengineering and Biomedical Engineering
- Construction Engineering Technology/ Technician

Master's, Doctoral, and Professional Degrees

- Electrical and Electronics Engineering
- Mechanical Engineering
- Bioengineering and Biomedical Engineering

Work-Based Learning and Expanded Learning Opportunities

| Exploration Activities | Work-Based Learning Activities |
|--|---|
| <ul style="list-style-type: none"> Participate in Skills USA competitions | <ul style="list-style-type: none"> Intern at an engineering firm Shadow a machinist |

Industry-Based Certifications

- Autodesk Associate (Certified User) Fusion 360
- Autodesk Associate (Certified User) Inventor for Mechanical Design
- Pre-Engineering/Engineering Technology - Job Ready
- Certified SOLIDWORKS Associate

Aligned Occupations

| Occupations | Median Wage | Annual Openings | % Growth |
|----------------------|-------------|-----------------|----------|
| Aerospace Engineers | \$110,843 | 481 | 9% |
| Industrial Engineers | \$97,074 | 1,263 | 10% |
| Mechanical Engineers | \$91,107 | 1,535 | 11% |
| Chemical Engineers | \$112,819 | 474 | 9% |
| Electrical Engineers | \$98,405 | 1,137 | 105% |

Successful completion of the Engineering program of study will fulfill requirements of the Business and Industry or STEM endorsement if the math and science requirements are met. Revised – August 2022

Engineering Course Information

Level 1

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|---------------|-------|
| 80100 Principles of Applied Engineering | 13036200 (1 credit) | None | 8-10 |
| 80740 (PLTW) MST Introduction to Engineering Design | N1303742 (1 credit) | None | 9-10 |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|-------------|------------|---------------|-------|
|-------------|------------|---------------|-------|

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|---------------------|---------------------------------|-------|
| 80716 MST Engineering Science | 13037500 (1 credit) | Alg I, Bio, Chem, or IPC & Phys | 11-12 |
| 80230 Engineering Design and Presentation I | 13036500 (1 credit) | Algebra I | 10-12 |
| 80770 (PLTW) MST Computer Integrated Manufacturing | N1303748 (1 credit) | None | 10-12 |
| 80760 (PLTW) MST Aerospace Engineering | N1303745 (1 credit) | None | 11-12 |
| 80780 (PLTW) MST Engineering Design & Development | N1303749 (1 credit) | None | 11-12 |
| 80750 (PLTW) Civil Engineering and Architecture | N1303747 | None | 11-12 |

Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|----------------------|---|-------|
| 80310, 80730 MST Engineering Design & Problem Solving | 13037300 (1 credit) | Algebra I and Geometry | 11-12 |
| 80960 Engineering Design and Presentation II | 13036600 (2 credits) | Algebra I and Geometry | 11-12 |
| 80340 Scientific Research & Design | 13037200 (1 credit) | Biology, Chemistry and either Integrated Physics (IPC) or Physics | 11-12 |
| 80970 Practicum in Science, Technology, Engineering and Math | 13037400 (2 credits) | Algebra I and Geometry | 11-12 |

Level 3 and Level 4 are Advanced CTE Courses
MST classes offered only at North Garland HS
PLTW classes offered only at North Garland HS



Programming and Software Development

Statewide Program of Study

The Programming and Software Development program of study explores the occupations and education opportunities associated with researching, designing, developing, and testing operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computer applications. This program of study may also include exploration into creating, modifying, and testing the codes, forms, and script that allow computer applications to run.

Secondary Courses for High School Credit

Level 1

8O056 (Middle School) Fundamentals of Computer Science

Level 2

8O110 (H) 8O115DC Computer Science I
8O130 AP Computer Science Principles

Level 3

8O118 IB Computer Science Standard Level
8O200 AP Computer Science A
8O430 Mobile App Development

Level 4

8O300 Computer Science III

Level 3 and Level 4 are Advanced CTE Courses

Postsecondary Opportunities

Associates Degrees

- Computer Programming/Programmer General
- Computer Software Engineer
- Computer Science
- Certified Software Analyst

Bachelor's Degrees

- Management Information Systems, General
- Computer Software Engineer
- Computer Science
- Information Science/ Studies

Master's, Doctoral, and Professional Degrees

- Computer Software Engineer
- Computer Science
- Information Science/ Studies

Work-Based Learning and Expanded Learning Opportunities

| Exploration Activities | Work-Based Learning Activities |
|--|--|
| <ul style="list-style-type: none"> • Join TSA • Participate in coding club at school | <ul style="list-style-type: none"> • Obtain an industry-based certification |

Industry-Based Certifications

- C++ Certified Associate Programmer
- Certified Entry-Level Python Programmer (PCEP)
- CodeHS Python Level 1
- Certified Professional Programmer
- Information Technology Specialist: Java



Aligned Occupations

| Occupations | Median Wage | Annual Openings | % Growth |
|--------------------------------------|-------------|-----------------|----------|
| Software Developer, Systems Software | \$103,334 | 2,985 | 25% |
| Software Developers, Application | \$104,499 | 6,311 | 30% |
| Computer Programmers | \$79,893 | 1,454 | 9% |

Successful completion of the Programming and Software Development program of study will fulfill requirements of the Business and Industry endorsement and STEM endorsement if the math and science requirements are met.

Revised – August 2022

Programming and Software Development Course Information

Level 1

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|---------------------|---------------|-------|
| 8O056 Fundamentals of Computer Science | 03580140 (1 credit) | None | 8-12 |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---------------------------------------|---------------------|---------------|-------|
| 8O110 (H), 8O115DC Computer Science I | 03580200 (1 credit) | Algebra I | 9-12 |
| 8O130 AP Computer Science Principles | A3580300 (1 credit) | Algebra I | 9-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|--|---------------|-------|
| 8O200 AP Computer Science A, MATH, LOTE | A3580110 (1 credit) A3580120 (1 credit) | None | 11-12 |
| 8O118 IB Computer Science Standard Level | I3580200 (2 credits) | Algebra I | 9-12 |
| 8O430 Mobile Application Development | 03580390 (1 credit) | Algebra I | 10-12 |

Level 4

| Course Name | Service ID | PREREQUISITES | GRADE |
|--------------------------------|---------------------|--|-------|
| 8O300 (H) Computer Science III | 03580350 (1 credit) | Computer Science II, AP Computer Science A | 11-12 |

Level 3 and Level 4 are Advanced CTE Courses



Renewable Energy & Mechatronics

Statewide Program of Study

The Renewable Energy & Mechatronics program of study helps CTE learners discover to assemble, inspect, maintain, and repair different equipment required for renewable energy. It introduces students to solar photovoltaic equipment and wind turbines, the systems and processes used to maintain and manage these types of equipment, and helps students develop the skills needed to do so.

Secondary Courses for High School Credit

Level 1

8O100 Principles of Applied Engineering

Level 2

8O250, 8O255DC AC/DC Electronics

Level 3

8O405DC Solid State Electronics

Level 4

8O260, Applied Mathematics for Technical Professionals

8O370, 8O375DC Digital Electronics

8O415S DC Project Based Research

8O410 Practicum in STEM

Level 3 and Level 4 are Advanced CTE Courses

Postsecondary Opportunities

Associates Degrees

- Industrial Mechanics and Maintenance Technology
- Solar Energy/ Technology
- Engineering, Mechanics
- Engineering, General

Bachelor's Degrees

- Surveying Engineering
- Systems Engineering
- Engineering, Mechanics
- Engineering, General

Master's, Doctoral, and Professional Degrees

- Surveying Engineering
- Systems Engineering
- Manufacturing Engineering
- Engineering, General

Work-Based Learning and Expanded Learning Opportunities

| Exploration Activities | Work-Based Learning Activities |
|---|---|
| <ul style="list-style-type: none"> • Join Skills USA or a local science club | <ul style="list-style-type: none"> • Research four renewable energy companies and compare them |

Industry-Based Certifications

- C-200 Certified Industry 4.0 Automation Systems Specialist I - 201 Electrical Systems 1
- Industrial Technology Maintenance (ITM) - Electrical Systems
- NCCER Electronic System Technician Level I
- NCCER Electronic System Technician Level II
- Certified Electronics Systems Associate*
- Industrial Technology Maintenance (ITM) - Electronic Control Systems*
- ISCET Certified Electronics Technicians*
- OSHA 30 Hour General*

*IBC sunseting 8/31/24



Aligned Occupations

| Occupations | Median Wage | Annual Openings | % Growth |
|----------------------------------|-------------|-----------------|----------|
| Wind Turbine Services Technician | \$51,334 | 387 | 108% |
| Solar Photovoltaic Installer | \$43,957 | 47 | 81% |

Successful completion of the Renewable Energy program of study will fulfill requirements of the Business and Industry or STEM endorsement if the math and science requirements are met. Revised – August 2022

Renewable Energy & Mechatronics Course Information

Level 1

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|---------------|-------|
| 8O100 Principles of Applied Engineering | 13036200 (1 credit) | None | 8-12 |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|----------------------------------|---------------------|-----------------------------------|-------|
| 8O250, 8O255DC AC/DC Electronics | 13036800 (1 credit) | Principles of Applied Engineering | 10-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---------------------------------|---------------------|-------------------|-------|
| 8O405DC Solid State Electronics | 13036900 (1 credit) | AC/DC Electronics | 11-12 |

Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|----------------------|------------------------|-------|
| 8O260 Applied Mathematics for Technical Professionals | 12701410 (1 credit) | None | 11-12 |
| 8O370, 8O375DC Digital Electronics | 13037600 (1 credit) | Algebra I and Geometry | 10-12 |
| 8O415S DC Project Based Research | 12701500 (1 credit) | None | 11-12 |
| 8O410 Practicum in STEM | 13037400 (2 credits) | Algebra I and Geometry | 12 |

Level 3 and Level 4 are Advanced CTE Courses



Science, Technology, Engineering, and Mathematics

AC/DC Electronics 80250, 80255DC

TSDS PEIMS Code: 13036800 (ACDCELEC)

Grade Placement: 10–12, Credit: 1

Prerequisites: None

AC/DC Electronics focuses on the basic electricity principles of alternating current/direct current (AC/DC) circuits. Students will demonstrate knowledge and applications of circuits, electronic measurement, and electronic implementation. Through use of the design process, students will transfer academic skills to component designs in a project-based environment. Students will use a variety of computer hardware and software applications to complete assignments and projects. Additionally, students will explore career opportunities, employer expectations, and educational needs in the electronics industry.

AP Computer Science A 80200AP

TSDS PEIMS Code: A3580110 (APTACSAM)

Grade Placement: 10 –12, Credit: 2

Prerequisites: Computer Science I

This college-level course reinforces and increases the depth of understanding of the basic concepts and covers advanced programming concepts which are useful in preparation for the Computer Science Advanced Placement tests. The AP Computer Science II emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development and is meant to be the equivalent of a first-semester college-level course in Computer Science. The Java programming language is currently taught in this course. Students will learn to become responsible digital citizens by researching current laws and regulations and by practicing integrity and respect throughout the AP Computer Science II course. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance. Upon successful completion of the course, students will earn one credit of math and one credit of LOTE.

AP Computer Science Principles 80130AP

TSDS PEIMS Code: A3580300 (APCSPRIN)

Grade Placement: 9 –12, Credit: 1

Prerequisites: None

AP Computer Science Principles introduces students to the central ideas of computer science, instilling the ideas and practices of computational thinking and inviting students to understand how computing changes the world. The rigorous course promotes deep learning of computational content, develops computational thinking skills, and engages students in the creative aspects of the field. The course is unique in its focus on fostering students' creativity. Students are encouraged to apply creative processes when developing computational artifacts and to think creatively while using simulations to explore questions that interest them. Rather than teaching a particular programming language or tool, the course focuses on using technology and programming as a means to solve computational problems and create exciting and personally relevant artifacts. Students design and implement innovative solutions using an iterative process similar to what artists, writers, computer scientists, and engineers use to bring ideas to life.



Science, Technology, Engineering, and Mathematics

Applied Mathematics for Technical Professionals 8O260

TSDS PEIMS Code: 12701410 (APMATHTP)

Grade Placement: 11–12

Credit: 1 Prerequisite: None

The process standards weave knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. These standards are integrated at every grade level and course. When possible, students will apply mathematics to problems arising in everyday life, society, and the workplace. Students will use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the process and the reasonableness of the solution. Students will select appropriate tools such as real objects, manipulatives, paper and pencil, and technology and techniques such as mental math, estimation, and number sense to solve problems. Students will effectively communicate mathematical ideas, reasoning, and their implications using multiple representations such as symbols, diagrams, graphs, and language. Students will use mathematical relationships to generate solutions and make connections and predictions. Students will analyze mathematical relationships to connect and communicate mathematical ideas. Students will display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication. Note: This course satisfies a math credit requirement for students on the Foundation High School Program.

Computer Maintenance 8K906S GRCTC, 8K907S DC GRCTC

TSDS PEIMS Code: 13027300 (COMPMTN)

Grade Placement: 10–12 Credit: 1

Prerequisite: None

Recommended Prerequisite: Principles of Information Technology.

Recommended Corequisite: Computer Maintenance Lab. In Computer Maintenance, 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.

Computer Science I 8O110(H), 8O115DC

TSDS PEIMS Code: 03580200 (TACS1)

Grade Placement: 9-12 Credit: 1

Prerequisite: Algebra I

Computer Science I will foster students' creativity and innovation by presenting opportunities to design, implement, and present meaningful programs through a variety of media. Students will collaborate with one another, their instructor, and various electronic communities to solve the problems presented throughout the course. Through data analysis, 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. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of the principles of computer science through the study of technology operations, systems, and concepts. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.



Science, Technology, Engineering, and Mathematics

Computer Science III 80300 (H)

TSDS PEIMS Code: 03580350 (TAC2)

Grade Placement: 11-12, Credit: 1

Prerequisite: AP Computer Science A

Computer Science III will foster students' creativity and innovation by presenting opportunities to design, implement, and present meaningful programs through a variety of media. Through data analysis, 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. Students will gain an understanding of advanced computer science data structures through the study of technology operations, systems, and concepts in a collaborative learning environment.

Cybersecurity Capstone 80985DC GRCTC

TSDS PEIMS Code: 035808955

Grade Placement: 11-12, Credit 1

Prerequisite: Foundations of Cybersecurity

In the Cybersecurity Capstone course, students will develop the knowledge and skills needed to explore advanced concepts related to the ethics, laws, and operations of cybersecurity. Students will examine trends and operations of cyberattacks, threats, and vulnerabilities. Students will develop security policies to mitigate risks. The skills obtained in this course prepare students for additional study toward industry certification.

Digital Electronics 80370, 80375 DC

TSDS PEIMS Code: 13037600 (DIGELC)

Grade Placement: 11–12, Credit: 1Gr

Prerequisites: Algebra I and Geometry

Digital Electronics is the study of electronic circuits that are used to process and control digital signals. In contrast to analog electronics, where information is represented by a continuously varying voltage, digital signals are represented by two discrete voltages or logic levels. This distinction allows for greater signal speed and storage capabilities and has revolutionized the world of electronics. Digital electronics is the foundation of modern electronic devices such as cellular phones, digital audio players, laptop computers, digital cameras, and high-definition televisions. The primary focus of Digital Electronics is to expose students to the design process of combinational and sequential logic design, teamwork, communication methods, engineering standards, and technical documentation.

Note: This course satisfies a math credit requirement for students on the Foundation High School Program.

Engineering Design and Presentation I 80230

TSDS PEIMS Code: 13036500 (ENGDSPR1)

Grade Placement: 10–12, Credit: 1

Prerequisite: Algebra I

Engineering Design and Presentation I is a continuation of knowledge and skills learned in Principles of Applied Engineering. Students enrolled in this course will demonstrate knowledge and skills of the design process as it applies to engineering fields using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Students will use a variety of computer hardware and software applications to complete assignments and projects. Through implementation of the design process, students will transfer advanced academic skills to component designs. Additionally, students explore career opportunities in engineering, technology, and drafting and what is required to gain and maintain employment in these areas.



Science, Technology, Engineering, and Mathematics

Engineering Design and Presentation II 80960 GRCTC

TSDS PEIMS Code: 13036600 (ENGDSR2)

Grade Placement: 11–12, Credit: 2

Prerequisites: Algebra I and Geometry, Principles of Applied Engineering or Engineering Design and Presentation I.

Engineering Design and Presentation II is a continuation of knowledge and skills learned in Engineering Design and Presentation I. Students enrolled in this course will demonstrate knowledge and skills of the design process as it applies to engineering fields using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Students will use a variety of computer hardware and software applications to complete assignments and projects. Through implementation of the design process, students will transfer advanced academic skills to component designs. Emphasis will be placed on using skills from ideation through prototyping.

Engineering Design and Problem Solving 80310, 80730 MST

TSDS PEIMS Code: 13037300 (ENG DPRS)

Grade Placement: 11–12 Credit: 1

Prerequisites: Algebra I and Geometry.

The Engineering Design and Problem-Solving course is the creative process of solving problems by identifying needs and then devising solutions. The solution may be a product, technique, structure, or process depending on the problem. Science aims to understand the natural world, while engineering seeks to shape this world to meet human needs and wants. Engineering design takes into consideration limiting factors or "design under constraint." Various engineering disciplines address a broad spectrum of design problems using specific concepts from the sciences and mathematics to derive a solution. The design process and problem solving are inherent to all engineering disciplines.

Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

Engineering Science 80716MST

TSDS PEIMS Code: 13037500 (ENGSCIEN)

Grade Placement: 10–12, Credit: 1

Prerequisite: Algebra I, Biology, Chemistry, or (IPC), or Physics

Engineering Science is an engineering course designed to expose students to some of the major concepts and technologies that they will encounter in a postsecondary program of study in any engineering domain. Students will have an opportunity to investigate engineering and high-tech careers. In Engineering Science, students will employ science, technology, engineering, and mathematical concepts in the solution of real-world challenge situations. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will also learn how to document their work and communicate their solutions to their peers and members of the professional community.

Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

Foundations of Cybersecurity 80140

TSDS PEIMS Code: 03580850 (TAF CYB)

Grade Placement: 9–12, Credit: 1

In the Foundations of Cybersecurity course, students will develop the knowledge and skills needed to explore fundamental concepts related to the ethics, laws, and operations of cybersecurity. Students will examine trends and operations of cyberattacks, threats, and vulnerabilities. Students will review and explore security policies designed to mitigate risks. The skills obtained in this course prepare students for additional study in cybersecurity. A variety of courses are available to students interested in this field. Foundations of Cybersecurity may serve as an introductory course in this field of study.



Science, Technology, Engineering, and Mathematics

Fundamentals of Computer Science 80056 (Middle School)

TSDS PEIMS Code: 03580140 (TAFCS)

Grade Placement: 9-12 Credit: 1

Fundamentals of Computer Science is intended as a first course for those students just beginning the study of computer science. Students will learn about the computing tools that are used every day. 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. 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 the principles of computer science through the study of technology operations and concepts. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.

International Baccalaureate Computer Science Standard Level 80118 (IB)

TSDS PEIMS Code: I3580200 (IBTACSSL) Credits: 2

Recommended prerequisites: Computer Science I, Algebra II.

Content requirements for IB Computer Science Standard Level are prescribed by the International Baccalaureate Organization. Subject guides may be obtained from International Baccalaureate of North America.

MST Biotechnology I 80790

TSDS PEIMS Code: 13036400 (BIOTECH1)

Grade Placement: 10–12, Credit: 1

Prerequisite: Biology.

In Biotechnology I, students will apply advanced academic knowledge and skills to the emerging fields of biotechnology such as agricultural, medical, regulatory, and forensics. Students will have the opportunity to use sophisticated laboratory equipment, perform statistical analysis, and practice quality-control techniques. Students will conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students in Biotechnology I will study a variety of topics that include structures and functions of cells, nucleic acids, proteins, and genetics. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

MST Medical Microbiology 8H740MST

TSDS PEIMS Code: 13020700 (MICRO)

Grade Placement: 11–12, Credit: 1

Prerequisites: Biology, Chemistry and Principles of Health Science

The Medical Microbiology course is designed to explore the microbial world, studying topics such as pathogenic and non-pathogenic microorganisms, laboratory procedures, identifying microorganisms, drug resistant organisms, and emerging diseases. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.



Science, Technology, Engineering, and Mathematics

MST Project Lead the Way – Aerospace Engineering 80760 MST

TSDS PEIMS Code: N1303745 (AERO)

Grade Placement: 11–12, Credit: 1

Prerequisite: PLTW Introduction to Engineering Design or Engineering Design

Description: This course propels students' learning in the fundamentals of atmospheric and space flight. As they explore the physics of flight, students bring the 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.

MST Project Lead the Way - Civil Engineering and Architecture 80750 MST

TSDS PEIMS Code: N1303747 (CEA)

Grade Placement: 11–12, Credit: 1

Prerequisite: PLTW Principles of Engineering

Description: Students learn about various aspects of civil engineering and architecture and apply their knowledge to the design and development of residential and commercial properties and structures. In addition, students use 3D design software to design and document solutions for major course projects. Students communicate and present solutions to their peers and members of the professional community.

MST Project Lead the Way – Computer Integrated Manufacturing 80770 MST

TSDS PEIMS Code: N1303748 (CIM)

Grade Placement: 10–12, Credit: 1

Prerequisite: PLTW Introduction to Engineering Design or Engineering Design

Description: Open doors in any career with computer science! In CSE, students create apps for mobile devices, automate tasks in a variety of languages, and find patterns in data. Students collaborate to create and present solutions that can improve people's lives, and weigh the ethical and societal issues of how computing and connectivity are changing the world.

MST Project Lead the Way – Engineering Design & Development 80780 MST

TSDS PEIMS Code: N1303749 (EDD)

Grade Placement: 11-12, Credit: 1

Prerequisite: PLTW IED or Engineering Design, Algebra

Description: The knowledge and skills students acquire throughout PLTW Engineering come together in EDD as they identify an issue and then research, design, and test a solution, ultimately presenting their solution to a panel of engineers. Students apply the professional skills they have developed to document a design process to standards, completing EDD ready to take on any post-secondary program or career.

MST Project Lead the Way – Human Body Systems 8H790 MST

TSDS PEIMS Code: N1302093 (HUMBODSY)

Grade Placement: 10-11, Credit: 1

Prerequisite: PLTW Principles of Biomedical Sciences

Description: Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis. Exploring science in action, students build organs and tissues on a skeletal Manikin; 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.



Science, Technology, Engineering, and Mathematics

MST Project Lead the Way – Introduction to Engineering Design 80740 MST

TSDS PEIMS Code: N1303742 (IED)

Grade Placement: 9-10, Credit: 1

Prerequisite: None

Description: this foundation course major focus is the design process and its application. Through hands-on projects, students apply engineering standards and document their work. Students use industry standard 3D modeling software to help them design solutions to solve proposed problems, document their work using an engineer's notebook, and communicate solutions to peers and members of the professional community.

MST Project Lead the Way – Medical Intervention 8H792 MST

TSDS PEIMS Code: N1302094 (MEDINT)

Grade Placement: 11-12, Credit: 1

Prerequisite: PLTW Principles of Biomedical Sciences and PLTW Human Body Systems

Description: Investigation of interventions involved in the prevention, diagnosis and treatment of disease. Students follow the life of a fictitious family as they investigate how to prevent, diagnose, and treat disease. Students explore how to detect and fight infection: screen and evaluate the code in human DNA: evaluate cancer treatment options; and prevail when the organs of the body begin to fail. Through real-world cases, students are exposed to a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics

MST Project Lead the Way – Principles of Biomedical Science 8H780 MST

TSDS PEIMS Code: N1302092 (PRBIOSCI)

Grade Placement: 9-10, Credit : 1

Prerequisite: None

Description: The Principles of the Biomedical Science course is divided into eight units designed to introduce students to the study of the human body and human medicine. Students investigate various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia and infectious diseases. They determine the factor that led to the death of a fictional person, and investigate lifestyle choices and medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, medicine, and research processes.

MST Scientific Research & Design 8O713 MST

TSDS PEIMS Code: 13037200 (SCIRD)

Grade Placement: 11-12, Credit: 1

Prerequisite: Biology, Chemistry, or IPC, and Physics

Scientific Research and Design is a broad-based course designed to allow districts and schools considerable flexibility to develop local curriculum to supplement any program of study or coherent sequence. The course has the components of any rigorous scientific or engineering program of study from the problem identification, investigation design, data collection, data analysis, formulation, and presentation of the conclusions. These components are integrated with the career and technical education emphasis of helping students gain entry-level employment in high-skill, high-wage jobs and/or continue their education. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students may take this course with different course content for a maximum of three credits. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.



Science, Technology, Engineering, and Mathematics

Mobile Application Development 80430

TSDS PEIMS Code: 03580390 (TAMBAS)

Grade Placement: 10-12, Credit: 1

Prerequisite: Algebra I

Mobile Application Development will foster students' creativity and innovation by presenting opportunities to design, implement, and deliver meaningful projects using mobile computing devices. Students will collaborate with one another, their instructor, and various electronic communities to solve problems presented throughout the course. Through data analysis, students will identify task requirements, plan search strategies, and use software development concepts to access, analyze, and evaluate information needed to program mobile devices. By using software design 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 the principles of mobile application development through the study of development platforms, programming languages, and software design standards.

Networking 8K930S GRCTC, 8K935DC GRCTC

TSDS PEIMS Code: 13027400 (NETWRK)

Grade Placement: 10–12 Credit: 1 P

Prerequisites: None. Recommended Prerequisites: Principles of Information Technology, Computer Maintenance, and Computer Maintenance Lab.

Recommended Corequisite: Networking Lab.

In Networking, students will develop knowledge of the concepts and skills related to data networking technologies and practices to apply them to personal or career development. To prepare for success, students will have opportunities to reinforce, apply, and transfer knowledge and skills to a variety of settings and problems

Pathophysiology 8H770, 8H775 DC MST

TSDS PEIMS Code: 13020800 (PATHO)

Grade Placement: 11–12 Credit: 1

Prerequisites: Biology and Chemistry

The Pathophysiology course is designed for students to conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students in Pathophysiology will study disease processes and how humans are affected. Emphasis is placed on prevention and treatment of disease. Students will differentiate between normal and abnormal physiology. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

Practicum in Science, Technology, Engineering, and Mathematics 80410

TSDS PEIMS Code:13037405 (EXPRSTEM1)

Grade Placement: 11-12, Credit: 2

Prerequisites: Algebra I and Geometry

Recommended Prerequisites: two Science, Technology, Engineering, and Mathematics (STEM) Career Cluster credits. Practicum in STEM 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.



Science, Technology, Engineering, and Mathematics

Practicum in Science, Technology, Engineering, and Mathematics - Engineering 8O970 GRCTC

TSDS PEIMS Code: 13037400 (PRCSTEM1),

Grade Placement: 11-12, Credit: 2

Prerequisites: Algebra I and Geometry

Practicum in STEM 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. Students shall be awarded one credit for successful completion of this course.

Principles of Applied Engineering 8O100

TSDS PEIMS Code: 13036200 (PRAPPENG)

Grade Placement: 7–12, Credit: 1

Prerequisite: None

Principles of Applied Engineering provides an overview of the various fields of science, technology, engineering, and mathematics and their interrelationships. Students will develop engineering communication skills, which include computer graphics, modeling, and presentations, by using a variety of computer hardware and software applications to complete assignments and projects. Upon completing this course, students will understand the various fields of engineering and will be able to make informed career decisions. Further, students will have worked on a design team to develop a product or system. Students will use multiple software applications to prepare and present course assignments.

Principles of Information Technology 8K100, 8K105, 8K700 MST

TSDS PEIMS Code: 13027200 (PRINIT)

Grade Placement: 9–10, Credit: 1

Prerequisites: None

In Principles of Information Technology, students will develop computer literacy skills to adapt to emerging technologies used in the global marketplace. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. Students will enhance reading, writing, computing, communication, and reasoning skills and apply them to the information technology environment.

Project Based Research - Cybersecurity 8O995DC (GRCTC)

SDS PEIMS Code: 12701500 (PROBS1)

Grade Placement: 12, Credit: 1

Prerequisites: Cybersecurity Capstone

Project-Based Research is a course for students to research a real-world problem. Students are matched with a mentor from the business or professional community to develop an original project on a topic related to career interests. Students use scientific methods of investigation to conduct in-depth research, compile findings, and present their findings to an audience that includes experts in the field. To attain academic success, students must have opportunities to learn, reinforce, apply, and transfer their knowledge and skills in a variety of settings.



Science, Technology, Engineering, and Mathematics

Project Based Research - Mechatronics 8O415DC

SDS PEIMS Code: 12701500 (PROBS1)

Grade Placement: 12, Credit: 1

Prerequisites: None

Project-Based Research is a course for students to research a real-world problem. Students are matched with a mentor from the business or professional community to develop an original project on a topic related to career interests. Students use scientific methods of investigation to conduct in-depth research, compile findings, and present their findings to an audience that includes experts in the field. To attain academic success, students must have opportunities to learn, reinforce, apply, and transfer their knowledge and skills in a variety of settings.

Scientific Research and Design 8O340

TSDS PEIMS Code:13037200 (SCRID)

Grade Placement: 11–12, Credit: 1

Prerequisite: Biology, Chemistry, or (IPC), and Physics

Description: Scientific Research and Design is a broad-based course designed to allow districts and schools considerable flexibility to develop local curriculum to supplement any program of study or coherent sequence. The course has the components of any rigorous scientific or engineering program of study from the problem identification, investigation design, data collection, data analysis, formulation, and presentation of the conclusions. These components are integrated with the career and technical education emphasis of helping students gain entry-level employment in high-skill, high-wage jobs and/or continue their education. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. Students may take this course with different course content for a maximum of three credits. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

Solid State Electronics DC 8O405

TSDS PEIMS Code : 13036900

Grade Placement: 11–12, Credit: 1

Prerequisite: AC/DC Electronics

Description: [SGHS] In Solid State Electronics, students will demonstrate knowledge and applications of advanced circuits, electrical measurement, and electrical implementation used in the electronics and computer industries. Students will transfer advanced academic skills to apply engineering principles and technical skills to troubleshoot, repair, and modify electronic components, equipment, and power electronic systems in a project based environment. Additionally, students will explore career opportunities, employer expectations, and educational needs in the electronics industry. Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

DC Note: This course will provide credit for the high school requirement as well as dual credit through Dallas College (equivalent of CETT1421). Students must meet the content area dual credit enrollment criteria. Dual Credit courses address learning objectives at greater depth along with higher expectations for student performance.