

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.

Secondary Courses for High School Credit

Level 1

- Principles of Biomedical Science (PLTW)

Level 2

- Human Body Systems (PLTW)

Level 3

- Medical Interventions (PLTW)

Level 4

- Biomedical Innovation (PLTW)
- Practicum in Science, Technology
- Scientific Research and Design

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 labShadow a healthcare or medical professional |

Industry-Based Certifications

- Biotechnician Assistant Credentialing Exam (BACE)
- Medical Laboratory Assistant
- Medical Laboratory Technician



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 – August 2022

Biomedical Science Course Information

Level 1

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|---------------|-------|
| 5410W Principles of Biomedical Science (PLTW) | N1302092 (1 credit) | None | 9-11 |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---------------------------------|---------------------|---|-------|
| 5425W Human Body Systems (PLTW) | N1302093 (1 credit) | Biology and Completed/Concurrent Chemistry Recommended: One course from Biomedical or Health Science | 10-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|------------------------------------|---------------------|--|-------|
| 5415W Medical Interventions (PLTW) | N1302094 (1 credit) | Biology, Chemistry, and Principles of Biomed or Human Body Systems | 11-12 |

Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--|----------------------|---|-------|
| 5440W Biomedical Innovation (PLTW) | N1302095 (1 credit) | Principles of Biomed or Human Body Systems and Medical Interventions | 11-12 |
| 0030 ISM - Scientific Research and Design | 13037200 (1 credit) | Biology, Chemistry, IPC, or Physics | 11-12 |
| 5085 Practicum in Science, Technology, Engineering, and Math | 13037400 (2 credits) | Algebra I and Geometry Recommended: 1 course from Biomedical Science | 12 |

Science, Technology, Engineering, and Mathematics Career Cluster

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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

- Fundamentals of Computer Science (Coding A - FJH)

Level 2

- Computer Science I
- AP Computer Science Principles

Level 3

- AP Computer Science A-Math/LOTE
- Digital Forensics

Level 4

- PLTW Cybersecurity
- Practicum in STEM
- Independent Study in Evolving/Emerging Technologies

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities

- Join TSA
- Job shadow a computer system analyst or information security analyst

Work-Based Learning Activities

- Obtain a cybersecurity IBC

Industry-Based Certifications

- Cisco 200-201 CBROPS - Understanding Cisco Cybersecurity Operations Fundamentals
- CompTIA A+ Certification
- CompTIA Network+
- CompTIA Security+
- Cybersecurity Fundamentals
- CyberSecurity Fundamentals: An ISACA Certificate
- Oracle Certified Associate Java SE 8 Programmer

- Associate of (ISC)*
*IBC sunseting 8/31/24

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



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 endorsement. Revised – August 2022

Cybersecurity Course Information

Level 1

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

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|-------------------------------------|---------------------|---------------|-------|
| 0500 Computer Science I | 03580200 (1 credit) | Algebra I | 9-12 |
| 0505 AP Computer Science Principles | A3580300 (1 credit) | Algebra I | 9-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--------------------------------------|---------------------|---|-------|
| 0510 AP Computer Science A-Math/LOTE | A3580110 (1 credit) | Computer Science II | 11-12 |
| 5203 Digital Forensics | 03580360 (1 credit) | PREQ: Geometry and Computer Science I Recommended: CS II | 11-12 |

Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|----------------------|---|-------|
| 5204W PLTW Cybersecurity | 03580850 (1 credit) | Computer Science II or AP Computer Science Principles | 10-12 |
| 5085 Practicum in STEM | 13037400 (2 credits) | Algebra I and Geometry Recommended: One course from Computer Science | 12 |
| 0610 Independent Study in Evolving/Emerging Technologies I | 03581500 (1 credit) | AP Computer Science A | 11-12 |
| 0612 Independent Study in Evolving/Emerging Technologies II | 03581500 (1 credit) | ISM in EE Tech I | 12 |

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.

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

- Introduction to Engineering Design (PLTW)

Level 2

- Robotics I
- Engineering Science

Level 3

- SystemsGo Rocketry - Engineering Design and Presentation I
- Aerospace Engineering (PLTW)
- Digital Electronics
- Civil Engineering and Architecture (PLTW)

Level 4

- Engineering and Design and Development (PLTW)
- Practicum in STEM
- ISM - Scientific Research and Design

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

- Participate in Skills USA competitions

Work-Based Learning Activities

- Intern at an engineering firm
- Shadow a machinist

Industry-Based Certifications

- Autodesk Associate (Certified User) AutoCAD
- Autodesk Associate (Certified User) Fusion 360
- Autodesk Associate (Certified User) Inventor for Mechanical Design
- Autodesk Associate (Certified User) Revit Architecture
- Autodesk Associate (Certified User) Revit for Electrical
- Autodesk Associate (Certified User) Revit for Structural Design
- Autodesk Certified Professional Fusion 360
- Autodesk Certified Professional in AutoCAD for Design and Drafting
- Autodesk Certified Professional in Civil 3D for Infrastructure Design
- Autodesk Certified Professional in Inventor for Mechanical Design
- Autodesk Certified Professional in Revit for Architectural Design
- Autodesk Certified Professional in Revit for Electrical Design
- Autodesk Certified Professional in Revit for Structural Design
- C-103 Certified Industry 4.0 Associate - Robot System Operations
- Engineering Technology Foundations
- Lean Six Sigma Green Belt Certification
- Pre-Engineering/Engineering Technology - Job Ready

- Certified SOLIDWORKS Associate*
*IBC sunseting 8/31/24

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 |
|---|---------------------|---------------|-------|
| 5270W Introduction to Engineering Design (PLTW - IED) | N1303742 (1 credit) | None | 9-12 |

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---------------------------------------|---------------------|--|-------|
| 5272 Robotics I | 13037000 (1 credit) | None | 9-12 |
| 4900W Engineering Science (PLTW - ES) | 13037500 (1 credit) | IED, Algebra I, and Biology. Recommended: Geometry; and IPC, Chemistry or Physics | 10-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|---|---------------------|------------------------------|-------|
| 5280W Civil Engineering & Architecture (PLTW- CEA) | N1303747 (1 credit) | Algebra I and IED | 10-12 |
| 5271 SystemsGo Rocketry - Engineering Design and Presentation I | 13036500 (1 credit) | IED Coreq: Algebra II | 10-12 |
| 5290W Aerospace Engineering (PLTW - AE) | N1303745 (1 credit) | Geometry, IED, and CEA or ES | 11-12 |
| 3605W Digital Electronics (PLTW - DE) | 13037600 (1 credit) | Geometry, IED, and CEA or ES | 11-12 |

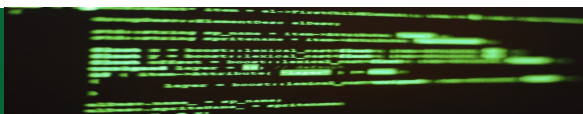
Level 4

| COURSE NAME | SERVICE ID | PREREQUISITES | Grade |
|---|----------------------|--|-------|
| 5295W Engineering Design and Development (PLTW - EDD) | N1303749 (1 credit) | IED, ES, and 1 additional PLTW | 11-12 |
| 5085 Practicum in Science, Technology, Engineering, and Mathematics | 13037400 (2 credits) | Algebra I and Geometry Recommended: 1 course from Engineering | 12 |
| 0030 ISM - Scientific Research & Design | 13037200 (1 credit) | Biology, Chemistry and IPC or Physics | 11-12 |

Science, Technology, Engineering, and Mathematics Career Cluster

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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

- Fundamentals of Computer Science – (Coding A – FJH)

Level 2

- AP Computer Science Principles
- Computer Science I

Level 3

- AP Computer Science A, Math/LOTE
- Computer Science II

Level 4

- Computer Science III
- Practicum in Science, Technology, Engineering, and Mathematics
- Independent Study in Evolving/Emerging Technologies I and II

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

- Join TSA
- Participate in a coding club at school

Work-Based Learning Activities

- Obtain a programming IBC

Industry-Based Certifications

- C++ Certified Associate Programmer
- Certified Entry-Level Python Programmer (PCEP)
- Certified Professional Programmer
- CompTIA Linux+
- Oracle Certified Associate Java SE 8 Programmer
- Oracle Database SQL Certified Associate



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% |

Programming and Software Development

Course Information

Level 1

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

Level 2

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|-------------------------------------|---------------------|---------------|-------|
| 0500 Computer Science I | 03580200 (1 credit) | Algebra I | 9-12 |
| 0505 AP Computer Science Principles | A3580300 (1 credit) | Algebra I | 9-12 |

Level 3

| COURSE NAME | SERVICE ID | PREREQUISITES | GRADE |
|--------------------------------------|---------------------|--|-------|
| 0530W Computer Science II | 03580300 (1 credit) | Geometry, and Computer Science I or AP Computer Science Principles | 10-12 |
| 0510 AP Computer Science A-Math/LOTE | A3580110 (1 credit) | Computer Science II | 11-12 |

Level 4

| Course Name | Service ID | PREREQUISITES | COREQUISITES |
|---|----------------------|---|--------------|
| 0535 Computer Science III | 03580350 (1 credit) | AP Computer Science A | 11-12 |
| 5085 Practicum in Science, Technology, Engineering, and Mathematics | 13037400 (2 credits) | Algebra I and Geometry Recommended: One course from Computer Science | 12 |
| 0610 Independent Study in Evolving/Emerging Technologies I | 03581500 (1 credit) | AP Computer Science A | 11-12 |
| 0612 Independent Study in Evolving/Emerging Technologies II | 03581500 (1 credit) | ISM in EE Tech I | 12 |